RH Packaging Program Guidance

U.S. Department of Energy

Revision 2

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RH Packaging Program Guidance

Approval on File 1/9/08
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Office of the National TRU Program

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RECORD OF REVISION

Revision	Reason for Revision/Change
0	New RH Packaging Program Guidance. This manual must be used with DOE/WIPP 02-3284, *RH Packaging Operations Manual*, and DOE/WIPP 02-3285, *RH Packaging Maintenance Manual*.

Revision	Reason for Revision/Change
1	● Clarified that C of C is the governing document ● Updated links to online documents ● Added clarifying text for packaging users ● Changed some mandatory (shall) actions to optional (should) actions ● Added tools to the Recommended Tool List in Table 1.2 ● Updated the Maintenance Record with a new version ● Clarified Attachment C training requirements to show generator's requirements. ● Added the Ultra Light Lid Lift Tool. ● Changed spare parts titles to correspond to RHQCA Sheets. ● Removed the requirement for SME's to be evaluated. ● Changed the wording in the Nonconforming section to match current policies.

Revision	Reason for Revision/Change
2	● Changed links to the correct link for users. ● Added Rate of Rise leak detector as an option. ● Added a fully qualified QAPD program to Section 2.5 ● Changed approval letter to approval documentation in Section 1.1 ● Changed IL bolt drawings to show length to emphasize the difference. ● Added a reconciliation of maintenance log before being destroyed. ● Added Figures 1.14 through 1.16 for new tools. ● Changed names of spare parts to coincide with changes to RHQCA sheets. ● Added two types of trailers to Section 1.8. ● Added a clarification to Section 2.4 for O-ring expiration dates. ● Added payload preparation procedures in Section 3.0. ● Changed format on Maintenance Record in Figure 5.1. ● Added a step in training section to train to O-ring cleaning.

WIPP M&O CONTRACTOR TECHNICAL REVIEW ORGANIZATIONS
WASHINGTON TRU SOLUTIONS
CBFO REVIEW ORGANIZATIONS
OFFICE OF THE NATIONAL PROGRAM
QUALITY ASSURANCE
EDITORIAL

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this program guidance document is to provide the technical requirements for use, operation, inspection, and maintenance of the RH-TRU 72-B Waste Shipping Package (also known as the "RH-TRU 72-B cask") and directly related components. This document complies with the requirements as specified in the *RH-TRU 72-B Safety Analysis Report for Packaging (SARP)*, and Nuclear Regulatory Commission (NRC) *Certificate of Compliance (C of C) 9212*. If there is a conflict between this document and the SARP and/or C of C, the C of C shall govern. The C of C states: "...each package must be prepared for shipment and operated in accordance with the procedures described in Chapter 7.0, Operating Procedures, of the application." It further states: "...each package must be tested and maintained in accordance with the procedures described in Chapter 8.0, Acceptance Tests and Maintenance Program of the Application." Chapter 9.0 of the SARP tasks the Waste Isolation Pilot Plant (WIPP) Management and Operating (M&O) Contractor with assuring the packaging is used in accordance with the requirements of the C of C. Because the packaging is NRC-approved, users need to be familiar with Title 10 *Code of Federal Regulations* (CFR) §71.8, "Deliberate Misconduct." Any time a user suspects or has indications that the conditions of approval in the C of C were not met, the U.S. Department of Energy (DOE) Carlsbad Field Office (CBFO) shall be notified immediately. The CBFO will evaluate the issue and notify the NRC if required.

In accordance with 10 CFR Part 71, "Packaging and Transportation of Radioactive Material," certificate holders, packaging users, and contractors or subcontractors who use, design, fabricate, test, maintain, or modify the packaging shall post copies of (1) 10 CFR Part 21, "Reporting of Defects and Noncompliance," regulations, (2) Section 206 of the Energy Reorganization Act of 1974, and (3) NRC Form 3, Notice to Employees. These documents must be posted in a conspicuous location where the activities subject to these regulations are conducted.

This document details the instructions to be followed to operate, maintain, and test the RH-TRU 72-B packaging. This Program Guidance standardizes instructions for all users. Users shall follow these instructions or equivalent approved instructions. Following these instructions assures that operations meet the requirements of the SARP.

This document is available on the Internet at http://www.wipp.energy.gov/library/caolib.htm#containers. Users are responsible for ensuring they are using the current revision and change notices.

Sites must use operating procedures, abnormal operations and preshipment leakage-rate testing procedures from DOE/WIPP 02-3284, *RH Packaging Operations Manual*. Users may develop site-specific procedures addressing preoperational activities, quality assurance (QA), hoisting and rigging, and radiation health physics to be used in conjunction with the instructions contained in this document. The site's documents, and revisions, must then be submitted to CBFO at site.documents@wipp.ws for approval. A copy of the approval documentation from the CBFO shall be available for audit

purposes. The WIPP site has a unique disposal system and can vary from DOE/WIPP 02-3284 in their site-specific procedures as needed, as long as they are submitted and approved by the CBFO before use.

Users may recommend changes to this document by submitting their recommendations (in writing) to site.documents@wipp.ws for evaluation. If approved, the change(s) will be incorporated into this document for use by **ALL** users. Before first use and approximately every 12 months after, user sites will be audited to the requirements of this document to ensure compliance.

1.2 Conventions

The following conventions are used to standardize the language used in this document, or DOE/WIPP 02-3284:

- The words "will," "shall," and "must" denote requirements.
- The word "should" denotes a recommendation.
- The word "may" denotes permission, neither a requirement nor a recommendation.
- The word "check" is used to determine the condition or status.
- The word "verify" is used to confirm a condition.
- Parts shall be identified with the part number and name as listed in the work instructions (WIs).
- Standard abbreviations (not symbols) will be written out to express measurements and dimensions. For example, use 10 feet or 10 ft, but not 10'.
- Cautions, warnings, and notes, if used, shall precede the pertinent step(s).
- Cautions and notes shall not be used as instruction steps.

1.3 Definitions

- **Annual Maintenance** - Periodic maintenance performed at one-year intervals.
- **Bench Stock** - The on-hand supply of packaging components.
- **Carlsbad Field Office** (CBFO) - The U.S. Department of Energy (DOE) office responsible for managing the packaging and transportation activities associated with defense-generated contact-handled (CH) and remote-handled (RH) transuranic (TRU) materials.
- **Central Monitoring Room** (CMR) - A 24-hour/7-days-a-week communication center where the WIPP M&O Contractor can be reached.

- **Certificate of Compliance** (C of C) - A document issued by the Nuclear Regulatory Commission (NRC), approving the design of a specific radioactive materials packaging for use with specified payload limitations.

- **Certified Waste** - Waste confirmed to comply with acceptance criteria under an approved waste certification program.

- **Clean O-Ring** - Absence of free-standing vacuum grease, dirt, debris, or other foreign matter. Vacuum grease embedded in the O-ring is acceptable.

- **Five-Year Maintenance** - Periodic maintenance performed at five-year intervals.

- **Inspection/Inspect** - Unless otherwise addressed in this document, or DOE/WIPP 02-3284, this refers to personnel performing visual examination activities.

- **Leak Check Due Tag** - A tag attached to the outer cask pad eye. This tag shows a containment O-ring has been replaced and a maintenance leakage rate test is required before the next radioactive shipment. The reverse side of the tag will be marked in indelible ink stating which containment O-ring was replaced.

- **Maintenance Leakage Rate Test** - This includes leak tests to confirm that maintenance, repair, or component replacement have not degraded the containment system.

- **Maintenance Record** - A list of maintenance performed that becomes a permanent part of the documentation record.

- **Major Maintenance** - Consists of all repairs requiring welding or machining to correct a deficiency that affects the integrity of packaging or components. (Note: major repairs and major component replacements are the responsibility of the WIPP M&O Contractor). These repairs/replacements will be performed at a maintenance facility designated and approved by the WIPP M&O Contractor.

- **Minor Maintenance** - This consists of all repairs that can be readily accomplished and require no special tools, supplies, equipment, or highly skilled personnel, such as scratches on the sealing surface. (Note: minor repairs and minor component replacements shall be performed at sites that have the necessary equipment and qualified personnel to perform these tasks.)

- **Mobile Loading Unit** (MLU) - Trailer-mounted equipment necessary to load/unload a packaging at locations where fixed loading/unloading facilities do not exist.

- **Nonconformance Report** (NCR) - A document that identifies and records a nonconforming condition, and the action taken for the disposition of the nonconformance. Disposition of nonconforming items includes review, accept, reject, rework, use-as-is, or repair following approved instructions. All occurrences of NCRs require formal disposition by the WIPP M&O Contractor.

- **Nuclear Regulatory Commission** (NRC) - The federal agency that certifies the design, manufacture and QA of radioactive materials shipment packaging by certifying that all packaging meets the design requirements specified in 10 CFR Part 71.

- **Out-of-Service** - An administrative condition of the packaging that states it is not useable for radioactive shipments. When a packaging is out-of-service, a tag shall be attached that states the out-of-service condition.

- **Owner** - The organization to which the NRC C of C is issued (e.g., for DOE RH-TRU 72-B shipping packages).

- **Package** - Packaging together with its radioactive contents as presented for transport.

- **Packaging** - The assembly of components needed to comply with the packaging requirements of 10 CFR Part 71. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, and devices for cooling or absorbing mechanical shock. The vehicle, tiedown system, and auxiliary equipment may be designated as part of the packaging.

- **Periodic Leakage Rate Test** - Leak tests to verify containment boundary integrity.

- **Periodic Maintenance** (PM) - All maintenance activities performed annually or another periodic interval. Periodic maintenance activities listed in Section 5.0, Package Maintenance Instructions, will normally be performed at a maintenance facility designated and approved by the WIPP M&O Contractor.

- **Preshipment Leakage Rate Test** - Leak tests performed during assembly of a loaded package.

- **Remote-Handled Transuranic (RH TRU) Waste** - Transuranic waste with an external radiation dose rate exceeding 200 millirem/hr and less than or equal to 1,000 rem/hr at the waste container's surface.

- **Safety Analysis Report for Packaging** (SARP) - The official application to a packaging licensing agency (DOE or NRC) containing a demonstration of packaging effectiveness and ability to achieve the requirements in 10 CFR Part 71. The SARP is the controlling document for all packaging operations and maintenance.

- **Test and Handling (T&H) Equipment** - Equipment required to be on hand to load, unload, and test the packaging.

- **Transportation Tracking and Communication System (TRANSCOM)** - A vehicle tracking system for sensitive DOE shipments using satellite communications and interpretive computer software. The system allows the tracking of selected shipments without driver input. Two-way communications

are possible between the driver and the CMR/TRANSCOM Control Center (TCC), or from selected users via the TCC to another user.

- **Transuranic Content Codes** (TRUCON) - A uniform system grouping waste forms with similar characteristics for purposes of shipment in the packaging.

- **Transuranic (TRU) Waste** - Waste containing more than 100 nanocuries of alpha-emitting TRU isotopes per gram (with half-lives greater than 20 years), except:

  - High-level radioactive waste

  - Waste that the Secretary has determined, with concurrence of the Administrator, does not need the isolation required by the disposal regulations

  - Waste that the NRC has approved for disposal on a case-by-case basis according to 10 CFR Part 61, "Disposal of Radioactive Waste"

- **Remote-Handled (RH) Transuranic Waste Authorized Methods for Payload Control** (TRAMPAC) - The document that provides acceptable methods of preparation and characterization to qualify TRU waste as payload for transport in the packaging.

- **Users** - Those organizations, both DOE and commercial, authorized by the DOE or NRC to use the DOE-owned, NRC-approved packaging to ship or receive waste.

- **Visual Inspection** - An inspection of component attributes, usually performed using a checklist with acceptance and rejection criteria.

- **WIPP** - The Waste Isolation Pilot Plant.

- **Work Instruction** (WI) - A document containing detailed steps for performing specific maintenance activities.

- **Work Control** - The process by which all scheduled and unscheduled maintenance is initiated, prioritized, performed, and documented.

1.4 Preshipment Requirements

Before making the initial shipment of TRU waste, a large generator site must submit an RH TRAMPAC, hoisting and rigging, and Rad Health Physics, and associated QA plans, as necessary, to the CBFO for review and approval, at site.documents@wipp.ws. Additional guidance may be obtained by contacting the WIPP M&O Contractor. A new user must also perform the following:

- Have a program in place to accept return shipments from WIPP.

- Determine whether a fixed facility or a MLU will be required. The facility must meet minimum size and height requirements to conduct loading operations. Minimum electrical power requirements for operation of a crane and other equipment must be considered. For a MLU the facility does not need to obtain the consumables and bench stock of spare parts.

- Obtain the Testing and Handling (T&H) equipment (contact WTS Central Procurement) (see Table 1.1).

- Obtain the consumables and bench stock of spare parts (see Table 1.2 and Table 1.3).

- Prepare and approve site procedures (QA, hoisting and rigging, preoperational checks, and radiation health physics) for use during packaging operations (if needed).

- Obtain authorization to use, and complete training to operate, the DOE TRANSCOM satellite-based shipment tracking system (not required of small generator sites).

- Complete training and site-specific qualification of personnel to perform packaging operations.

- Before loading a cask with radioactive waste, an audit or surveillance will be conducted by the CBFO and the site shall be certified to use the cask upon successful completion of this audit. Initial certification will include observation of a loading operation and performance of a randomly selected Maintenance Instruction, to include preparation of associated documentation. (**This does not apply to small-quantity sites with shipments loaded by other trained personnel**.)

1.5 Packaging Description

The RH-TRU 72-B cask is a U.S. Department of Transportation (DOT) Type B packaging certified by the NRC. The packaging is a stainless steel, lead-shielded cask designed to provide double containment for shipment of TRU materials. The packaging consists of a cylindrical stainless steel and lead outer cask body, a separate inner stainless steel vessel (IV), and foam-filled impact limiters at each end of the cask body.

The outer cask body (OC) consists of a 1-1/2 in. thick, 41-1/8 in. outer diameter stainless steel outer shell, and a 1 in. thick, 32-3/8 in. inside diameter stainless steel inner shell, with 1-7/8 in. of lead shielding between the two shells. The cask bottom is 5-in.-thick stainless steel plate. The cask is closed by a 6 in. thick stainless steel lid, and eighteen 1-1/4 in. diameter bolts. The main closure lid has a double bore-type O-ring seal. The containment seal is the inner butyl O-ring seal, which is leak-testable. The cask lid has a gas sampling port and a seal test port. The gas sampling port is a containment boundary and is sealed with a leak-testable butyl O-ring seal.

The separate inner vessel consists of a 3/8-in.-thick, 32 in. outside diameter stainless steel shell, and a 1-1/2 in. thick stainless steel bottom plate. The inner vessel is closed by a 6-1/2 in. thick stainless steel lid, and eight 7/8 in. diameter bolts. The inner vessel closure lid has three bore-type O-ring seals. The containment seal is the middle butyl O-ring seal, which is leak-testable. The inner vessel lid has a helium backfill port and a combination vent/sampling port that are sealed with leak-testable butyl O-ring seals.

A polyurethane foam-filled stainless steel impact limiter is attached to each end of the cask body using six 1-1/4 in. diameter bolts. The radioactive contents are packaged within a carbon steel waste canister that is placed in the inner vessel.

1.6 Ancillary Equipment

1.6.1 Test Port Tool

Two test port tools are provided by the WIPP M&O Contractor RH Packaging Maintenance Engineer as shown in Table 1.1, Equipment for Fixed Loading Facility. Quantities are sufficient for user site requirements with provisions for limited spares. It is the responsibility of the user to request inventory spare parts when they reach minimum stocking levels. Replacements for defective tools are provided by the WIPP M&O Contractor RH Packaging Maintenance Engineer on an exchange basis.

Before each use, the tool shall be inspected for thread and O-ring damage, air flow-through tool, and free movement of moving parts. Replacement O-rings are listed on Figure 1.6, Test Port Tool, and in Table 1.2, Recommended User Supplied Tools, Equipment, and Consumables.

The OC/IV Test Port Tool provides for:

- Installing and removing port closure bolts
- Venting OC and IV cavities
- Checking the lid and port closure bolt containment O-rings for leakage (See Figure 1.5, Test Port Tool Interface.)

1.6.2 Tools, Equipment, and Consumables for RH Packaging Loading

Table 1.1 lists the tools and equipment required for fixed loading facility packaging operations. Quantities listed are for a fixed facility with limited spares. Tools listed in Table 1.1 can be purchased through the WTS Central Procurement Program. Test port tools are provided by the WIPP M&O Contractor RH Packaging Maintenance Engineer. Descriptions of the major tools and their uses are as follows:

- INNER LID TOOL - The inner lid tool is used for removing and replacing the IV lid. This tool may only be lifted by the pintle lid lifting device. The removable bar in the center is for operator assistance when placing the tool on the lid. (See Figure 1.11, Inner Lid Tool Assembly.)

- OUTER LID TOOL - The outer lid tool can be used for lifting either the inner or outer lid with the use of appropriate rigging and a crane hook. (See Figure 1.10, Outer Lid Tool Assembly.)

- CRANE LOAD CELL - A crane calibrated load cell must be used when removing the following components from the cask:

  - IV lid
  - OC lid
  - Impact limiters
  - Inner vessel

- ROAD CASK LIFTING YOKE - The road cask lifting yoke is used for the following:

  - Lift cask off trailer - Rotate, remove, and install the road cask
  - Center pivot trailer - Remove and install the road cask (see Figure 1.12, Lifting Yoke).

Table 1.1 - Equipment for Fixed Loading Facility

Tool	Quantity	Spares	✓
Test Port Tool (2078-500-01) (see Figure 1.6) (Drawing # 164-F-001)	2	1	
Helium Leak Detector	1 (user supplied)	Optional	
Model 20MT-10 Automated Rate of Rise Leak Test System (RoRLTS) (optional leak detector for preshipment leak test only)	1 (user supplied)	Optional	
Calibrated Standard Leak	1 (user supplied)	Optional	
Calibrated Temperature Measuring Device	1 (user supplied)	Optional	
Calibrated Barometer	1 (user supplied)	Optional	
Pintle Lid Lifting Device (Drawing # 411-L-013 W1-W5)	1 (user supplied)	Optional	
Calibrated Crane Load Cell	1 (user supplied)	Optional	
Outer Lid Tool (see Figure 1.10) (Drawing # 412-M-020-W7, W8)	1 (user supplied)	Optional	
Inner Lid Tool (see Figure 1.11) (Drawing # 412-M-020-W9, W10)	1 (user supplied)	Optional	
Road Cask Lifting Yoke (see Figure 1.12) (drawing # 412-M-020-W11, W12)	1 (user supplied)	Optional	

Table 1.2 - Recommended User Supplied Tools, Equipment, and Consumables

Item	Application	✓
Compressed-air Blow Gun	Clean threads, cavities with argon gas	
12 in. Adjustable Wrench x 2	Fastening gauges to compressed gas bottles	
1/4 in. Flat Tip Screwdriver	Hose clamps on leak test equipment	
Calibrated Torque Wrenches: • 600 to 700 lb-ft • 100 to 200 lb-ft • 15 to 20 lb-ft	Torque components	
Sockets: • 15/16 in., 12 pt. • 3/4 in., 12 pt. • 15/16 in., 6pt.	 Inner vessel lid closure bolts Port closure bolts Trailer trunnion cap bolts	
Hex Bit Sockets: • 7/8 in., 6 pt. • 1-1/2 in., 6 pt. (23 in. long minimum)	 Outer cask lid closure bolts Impact limiter bolts	
Taps for cleaning threads: • 3/4 in. - 10 UNC • 7/8 in. - 9 UNC • 1 in. - 20 UNEF • 1-1/8 in. - 18 UNEF • 1-1/4 in. - 7 UNC	 OC and IV lid lift point threads IV lid closure threads IV backfill port, IV seal test port, OC gas sampling port, OC seal test port threads IV gas sampling port threads OC lid closure, Impact limiter closure threads	
Tap handle	Operating taps	
1-3/32 in. drill bit and collar	IV lid closure bolt threaded insert	
1-9/16 in. drill bit and collar	OC lid and impact limiter closure bolt threaded inserts	
400 to 600 grit Emery Cloth	Smoothing out scratches and threads	
1/4 in. diameter punch	Installation of threaded inserts	
Utility Knife	Cutting tube for leak testing	
Small Flashlight	Inspection of threads and cavities	

Table 1.2 - Recommended User Supplied Tools, Equipment, and Consumables

Item	Application	✓
Lint-free rags (Wilshire Contamination Control, 5922 Farnsworth Court, Carlsbad, CA 92008), (619) 929-6950, Part Number 5710, Polywipe or Berkshire, P.O. Box 588, Great Garrington, MA 012301, Texwipe, (800) 242-7000	Cleaning	
Spray Bottle	Applying alcohol when cleaning surfaces	
Argon	Pressure cleaning threads	
Helium (welding grade with C of C)	Leak testing	
Vacuum Grease (with halide content less than 200 ppm)	Lubricate O-rings	
Alcohol (denatured)	Cleaning surfaces	
O-Ring: Buna-N, 70 durometer 1-3/4 in. ID X 1/8 in. W (PN 2-224) and 5/6 in. ID x 1/8 in. W (PN 2-208)	Test port tools	
Nickel Bearing Lubricant	Trailer trunnion bolts, IV/OC lid closure bolts, and impact limiter bolts	
Keensert Installation Tools (THXHD 2007L and THD 1409L)	Installation of threaded inserts	
Rubber Gloves	Cleaning	
Load Stabilizing Jack (McMaster-Carr #8817T62 or equivalent)	Stabilize free standing trailers	
RH Payload Cannister	Contain payload	
Tamper Seals, American Casting and Manufacturing Corp., 51 Commercial St., Plainview, NY 11803 (516-349-7010)	Seal package for shipment	
SS/Brass Brushes, flat and 3/4 in., 7/8 in., 1 in., 1-1/8 in., 1-1/4 in., and 1-3/4 in.	Bolt and port thread cleaning	

Figure 1.1 - RH Packaging

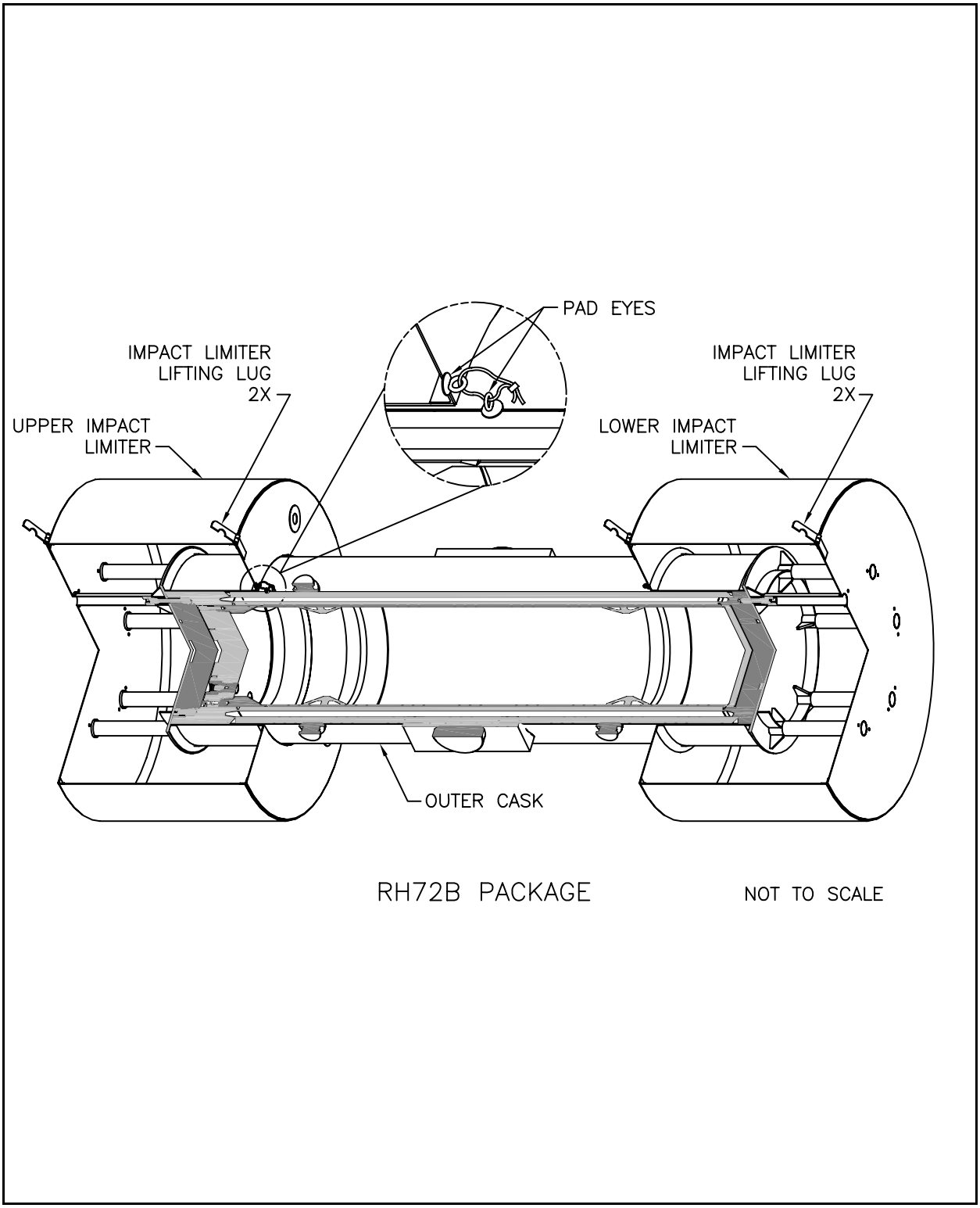


Figure 1.2 - RH Packaging Assembly

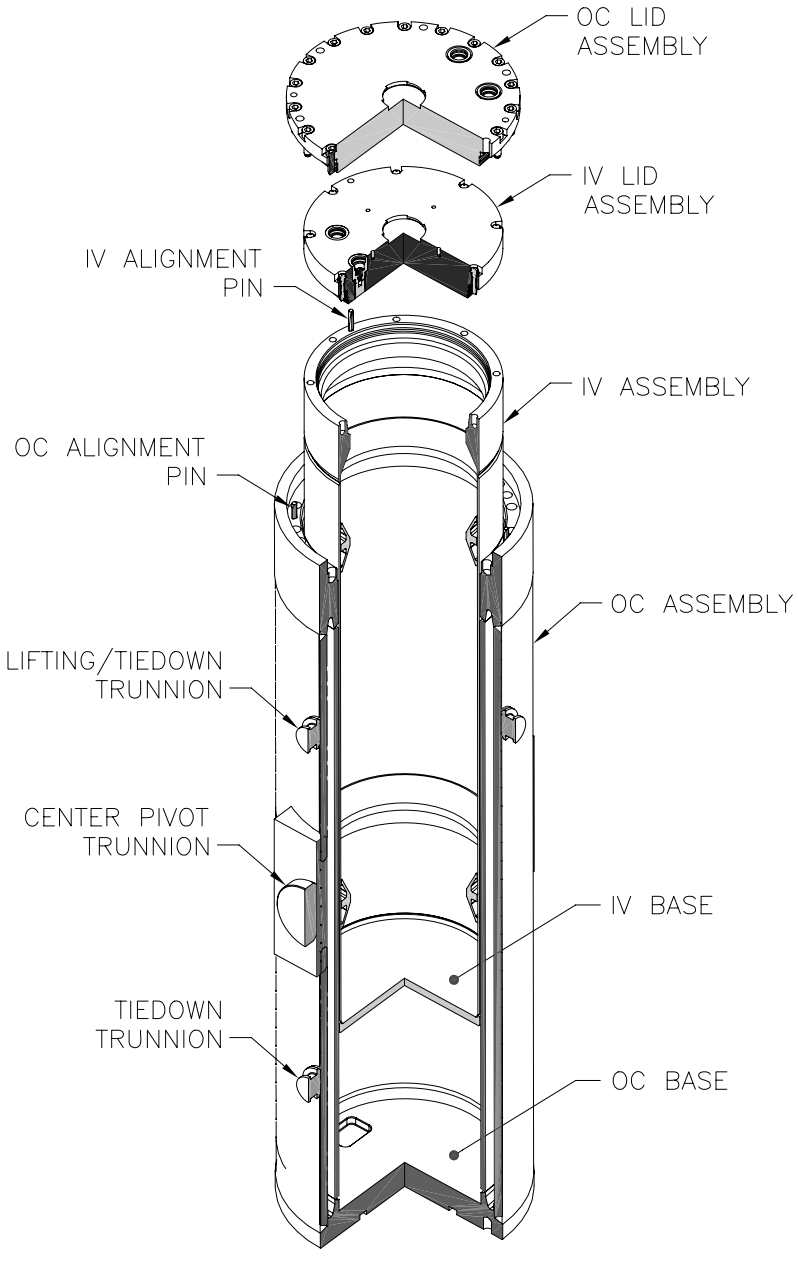


Figure 1.3 - Outer Cask Assembly

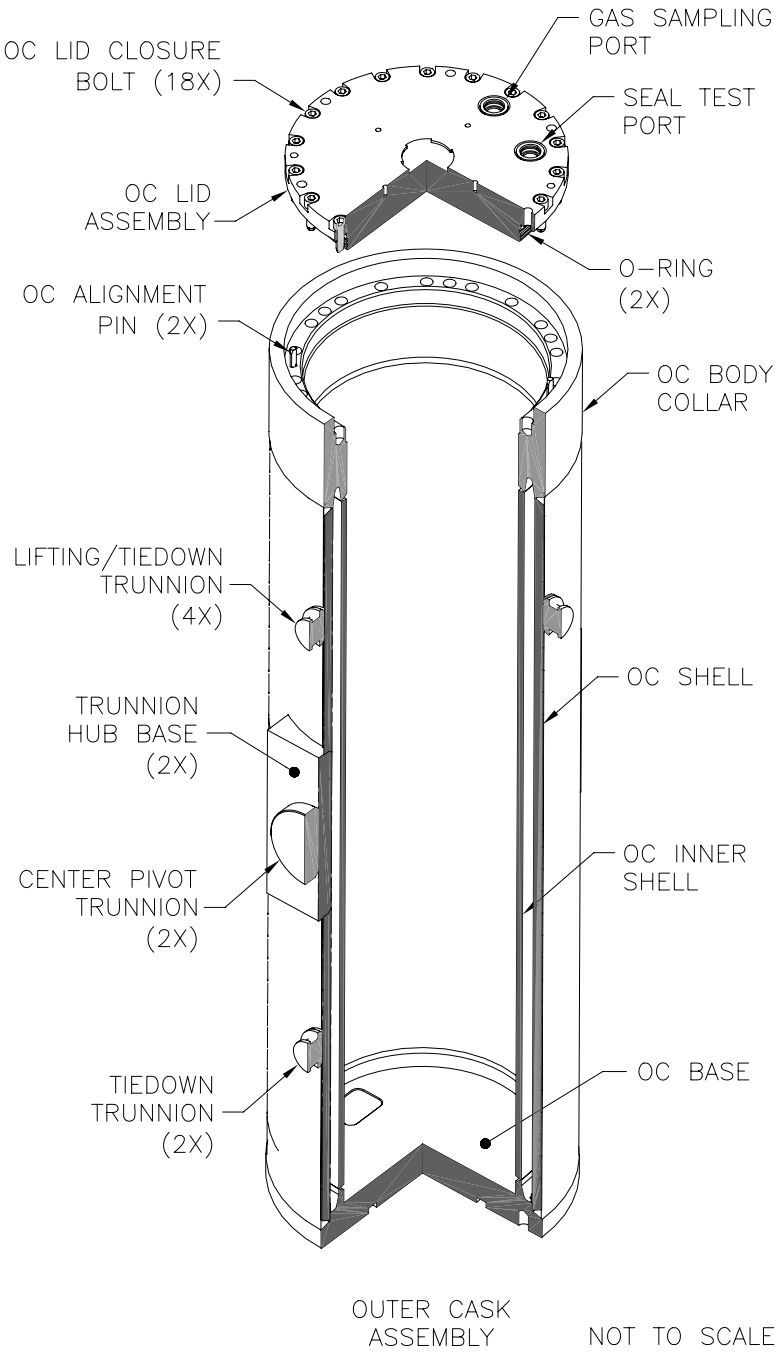


Figure 1.4 - Inner Vessel Assembly

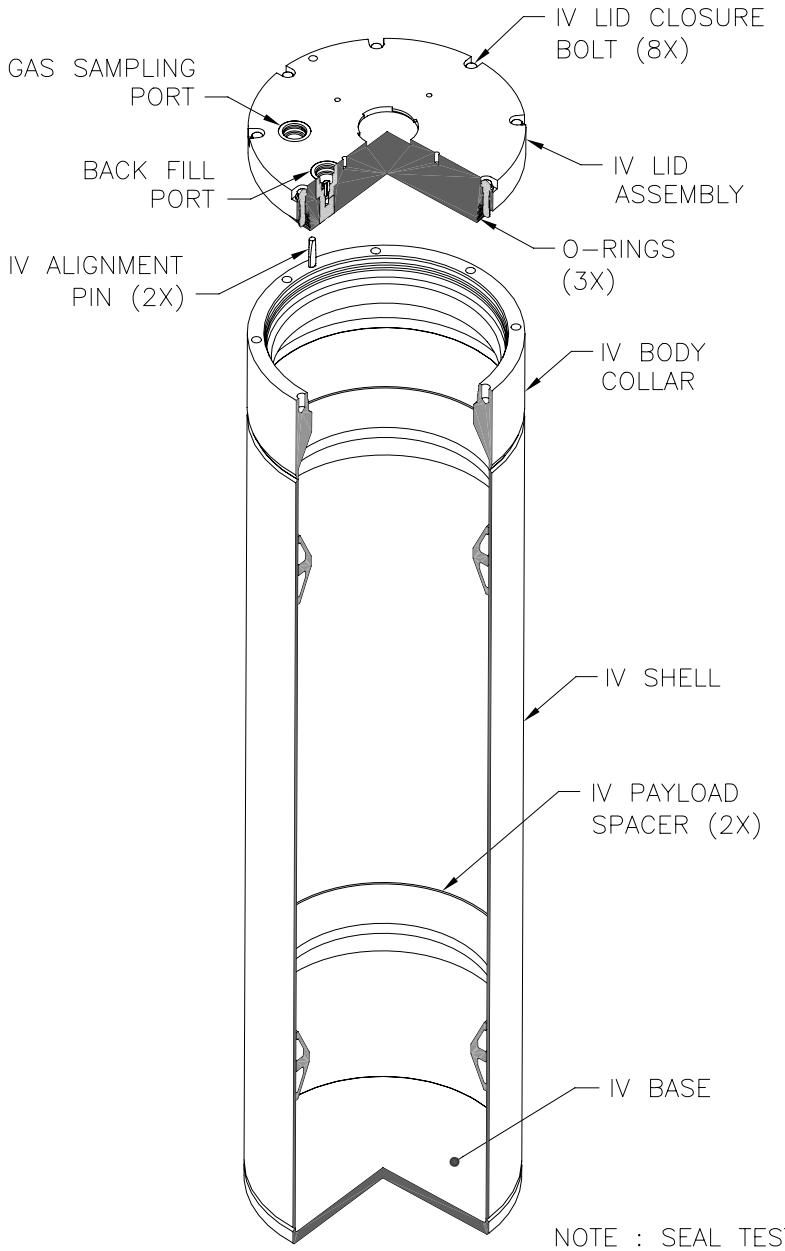


Figure 1.5 - Test Port Tool Interface

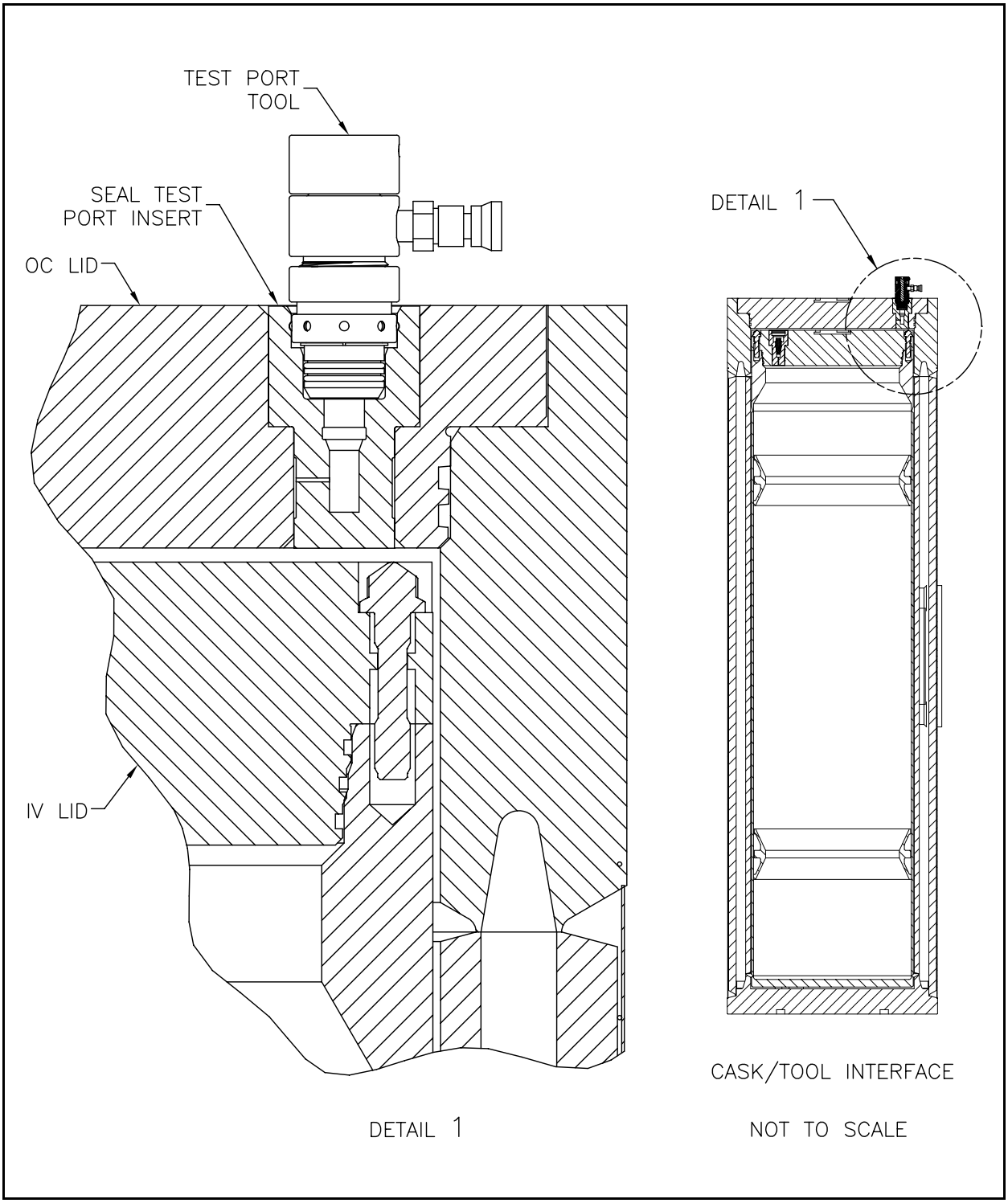
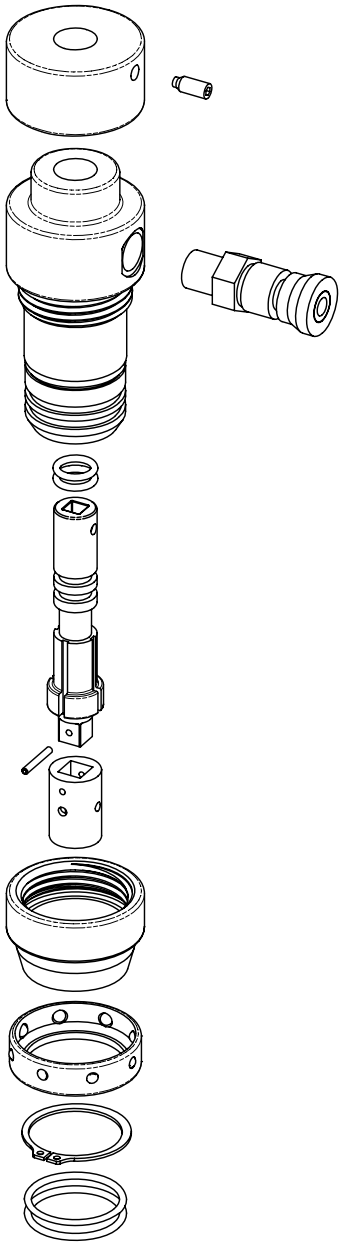
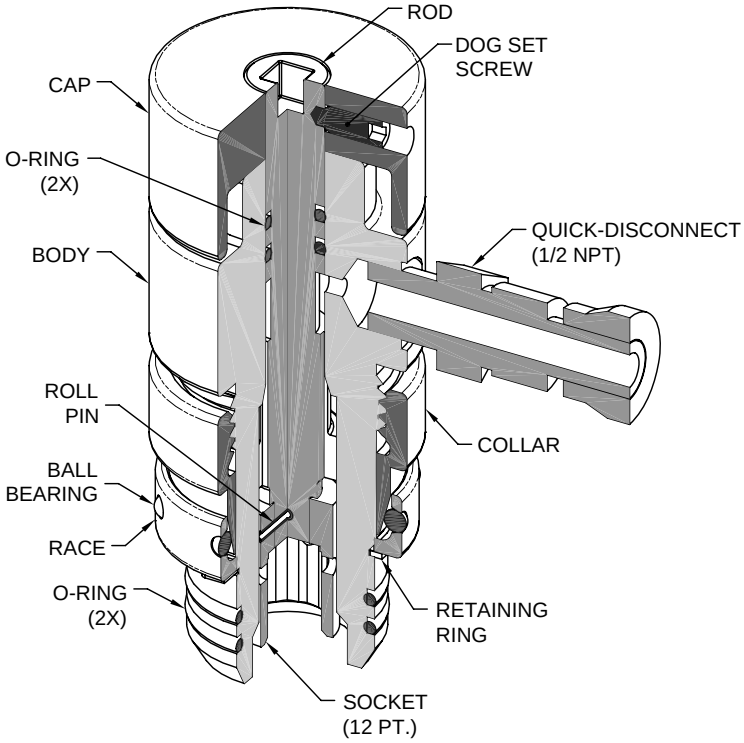


Figure 1.6 - Test Port Tool (164-F-001) - (P/N 2078-500-01)



EXPLODED ISOMETRIC VIEW



TEST PORT TOOL ASSEMBLY
NOT TO SCALE

NOTE : USES O-RINGS: BUNA-N, 70 DUROMETER, PART #2-208 & #2-224.

NOT TO SCALE

Figure 1.7 - Impact Limiter Components

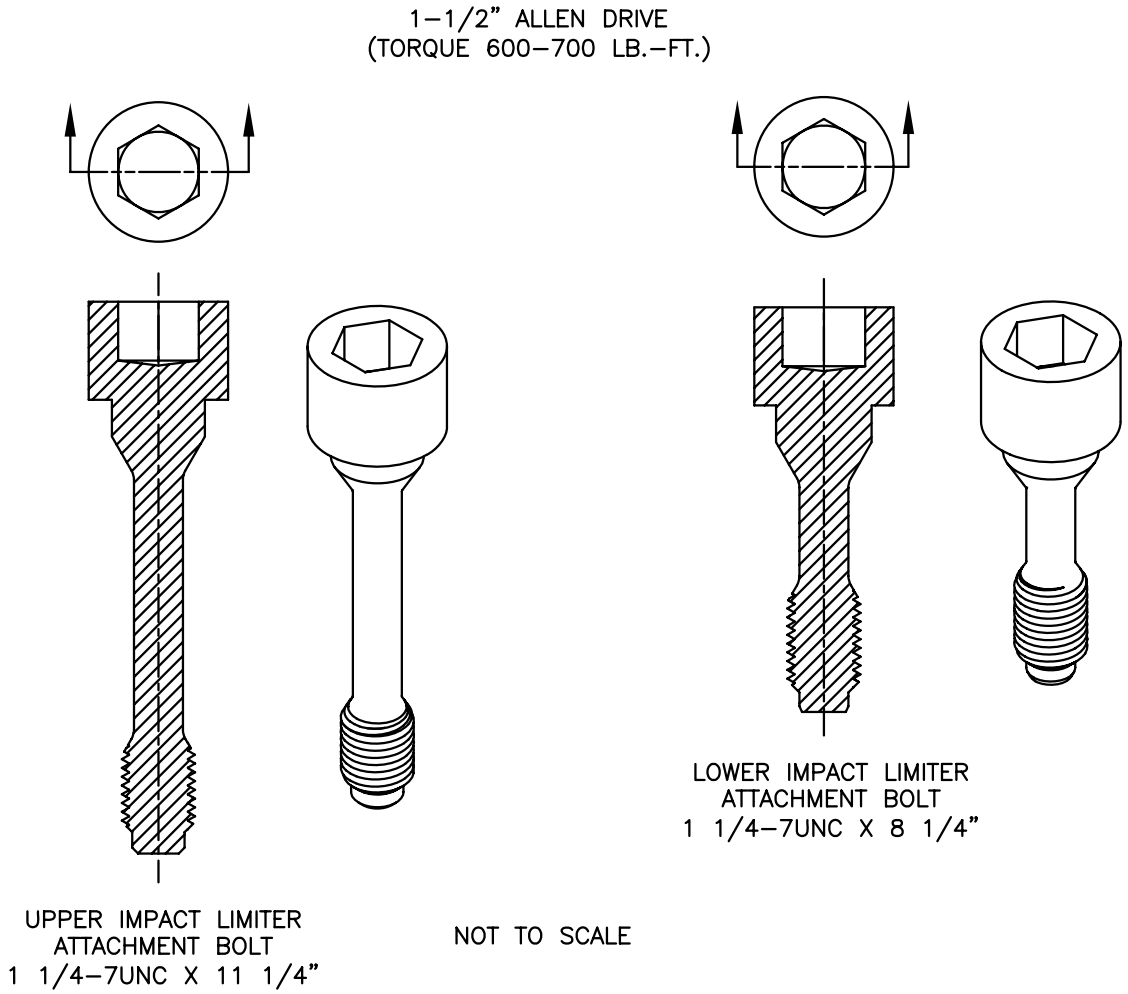


Figure 1.8 - Outer Cask Components

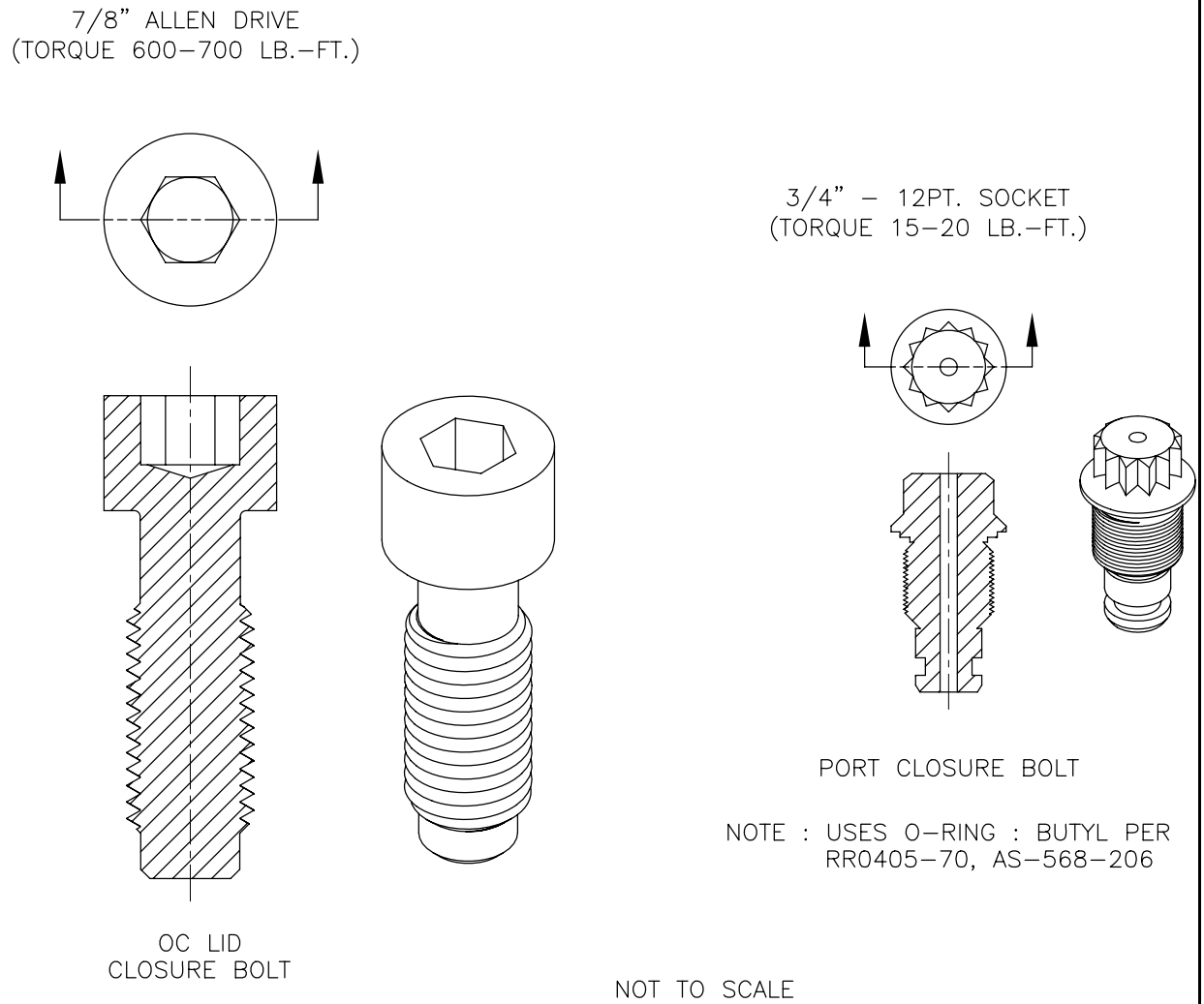


Figure 1.9 - Inner Vessel Components

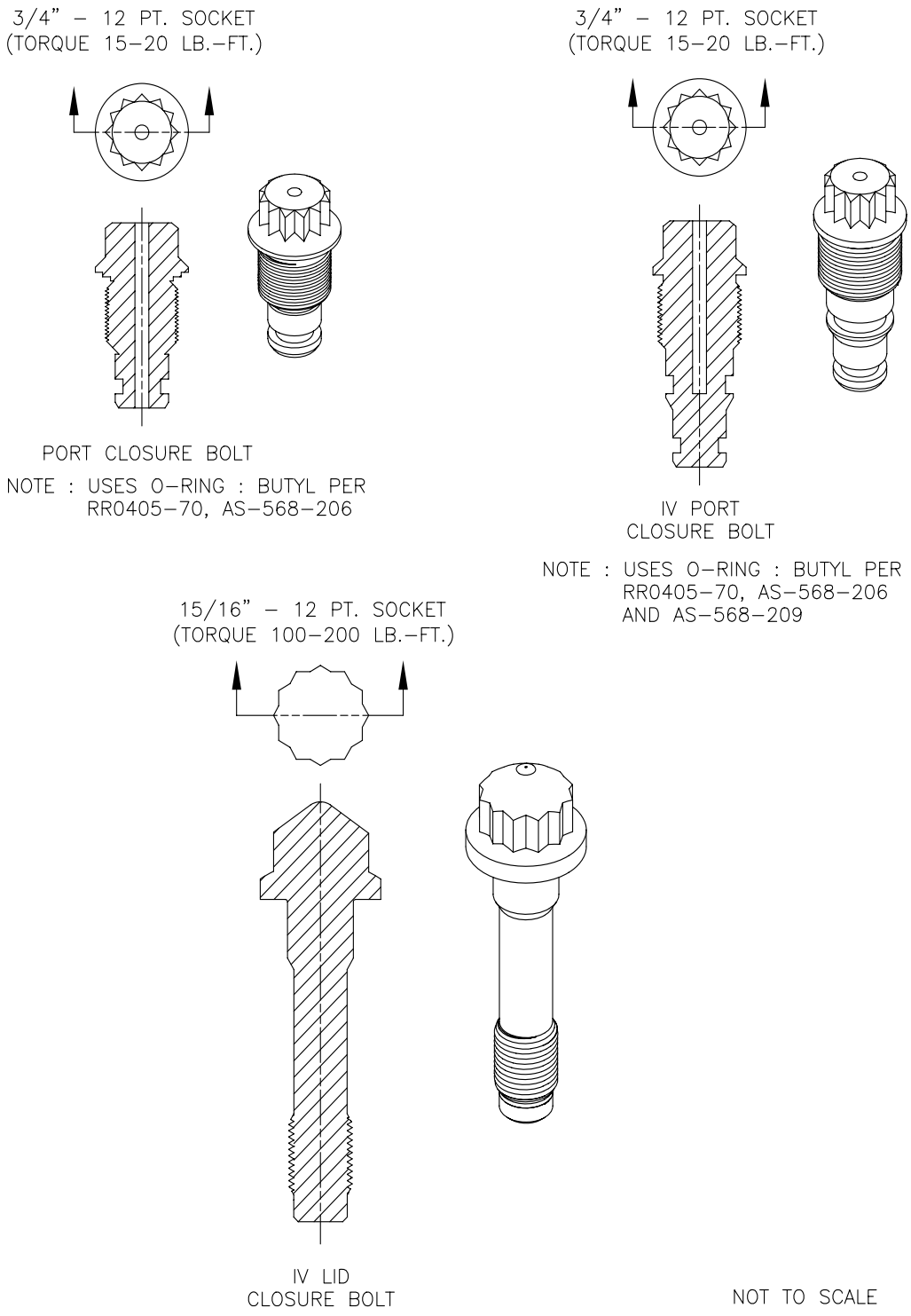


Figure 1.10 - Outer Lid Tool Assembly

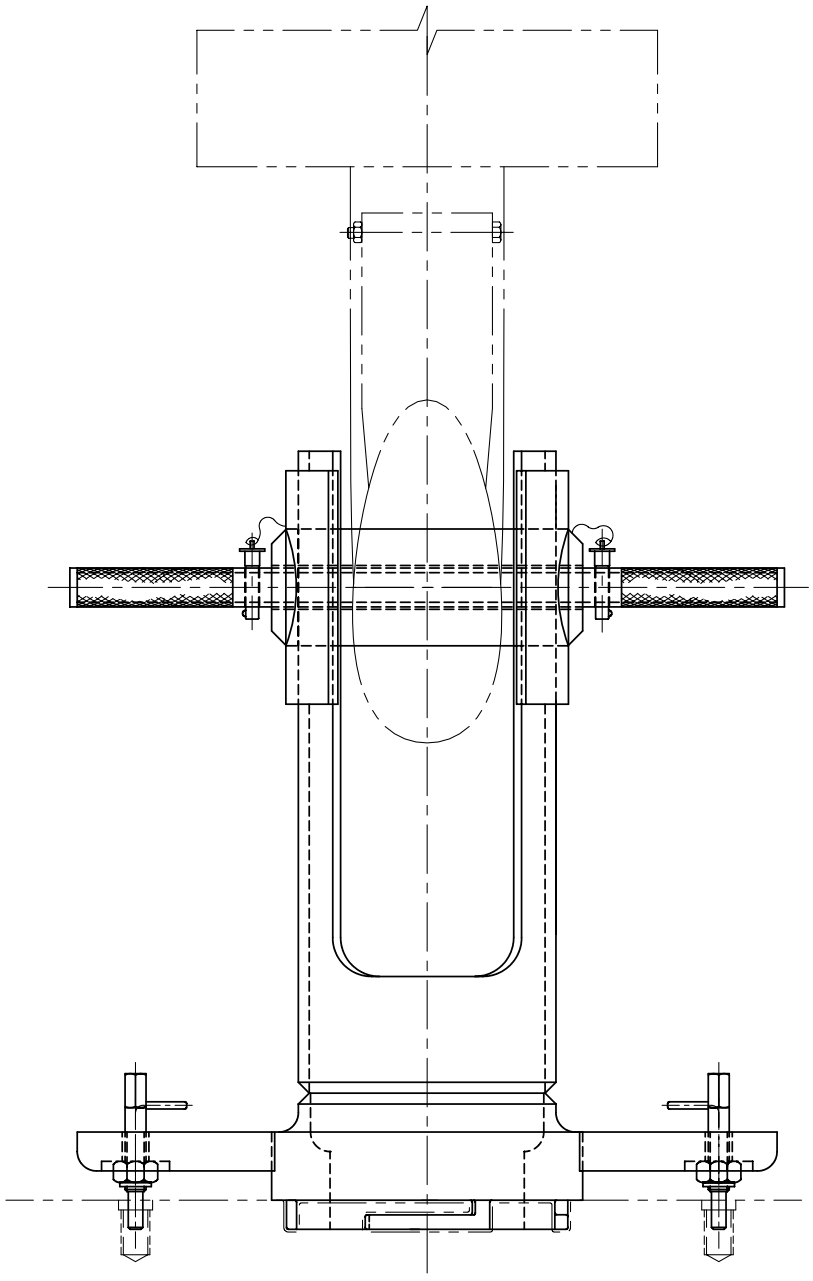


Figure 1.11 - Inner Lid Tool Assembly

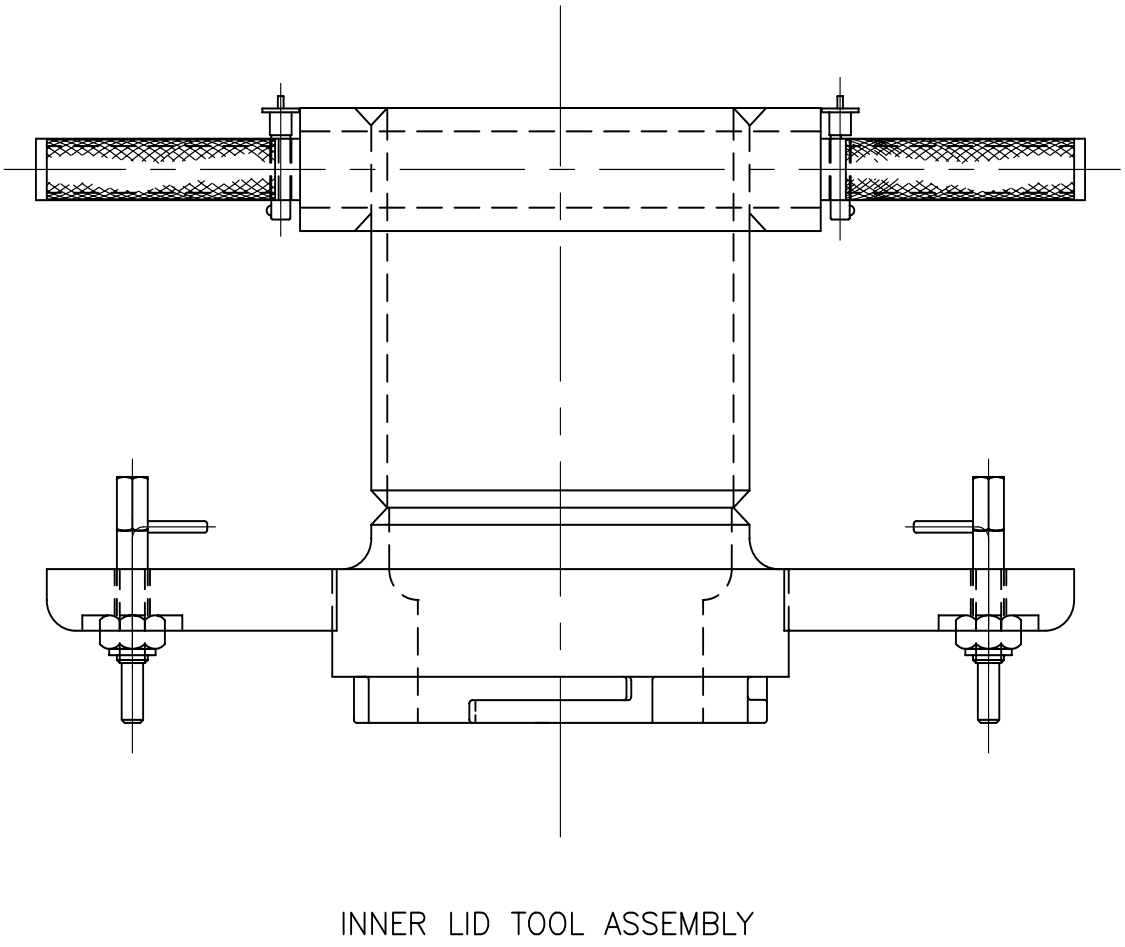
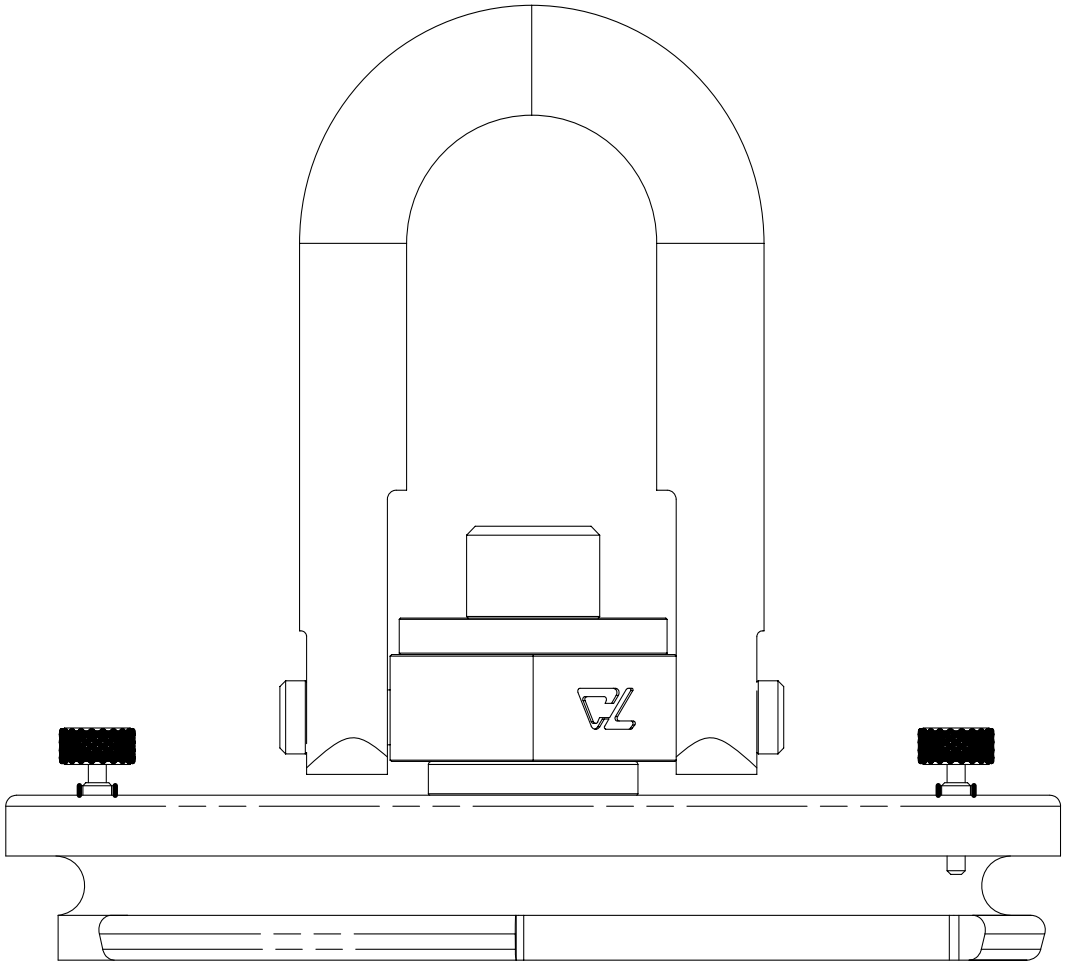
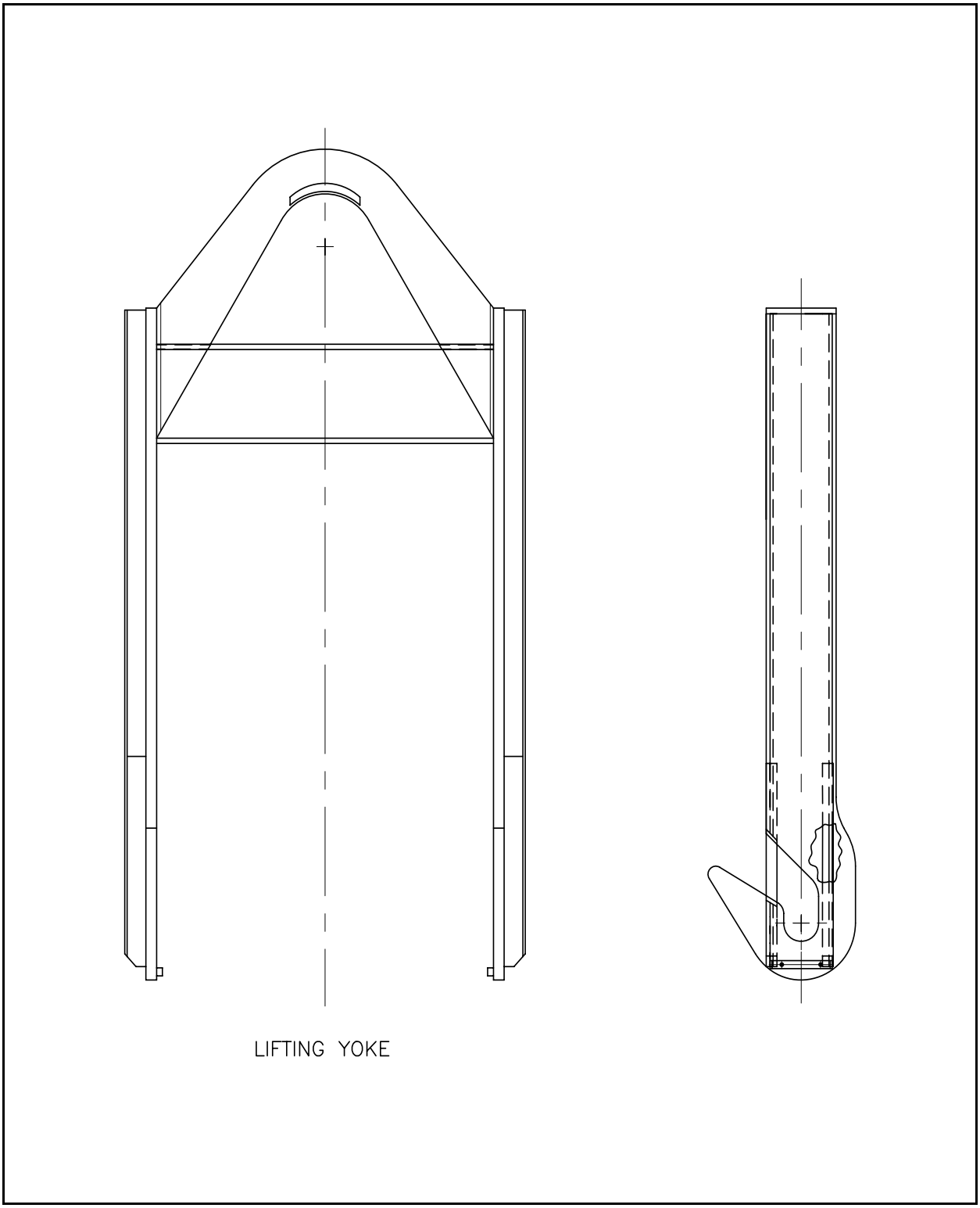


Figure 1.12 - Ultra Light Lid Lift Tool

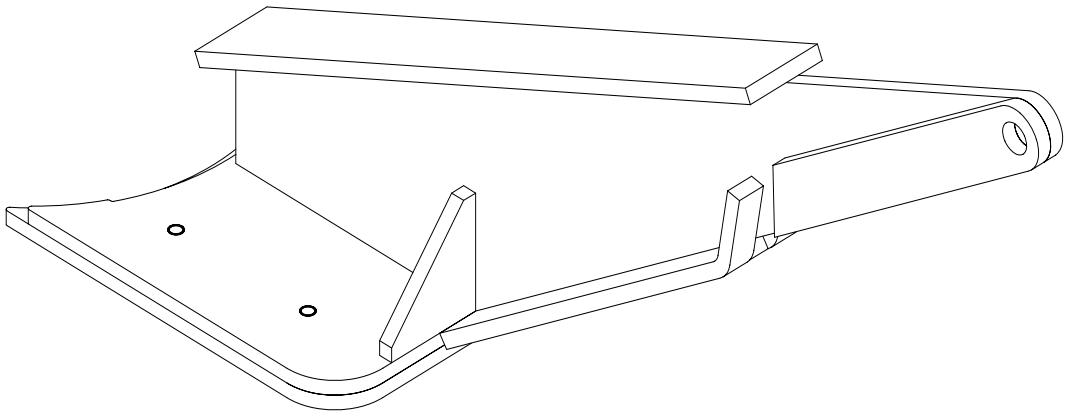


ULTRA LIGHT LID LIFT TOOL

Figure 1.13 - Lifting Yoke

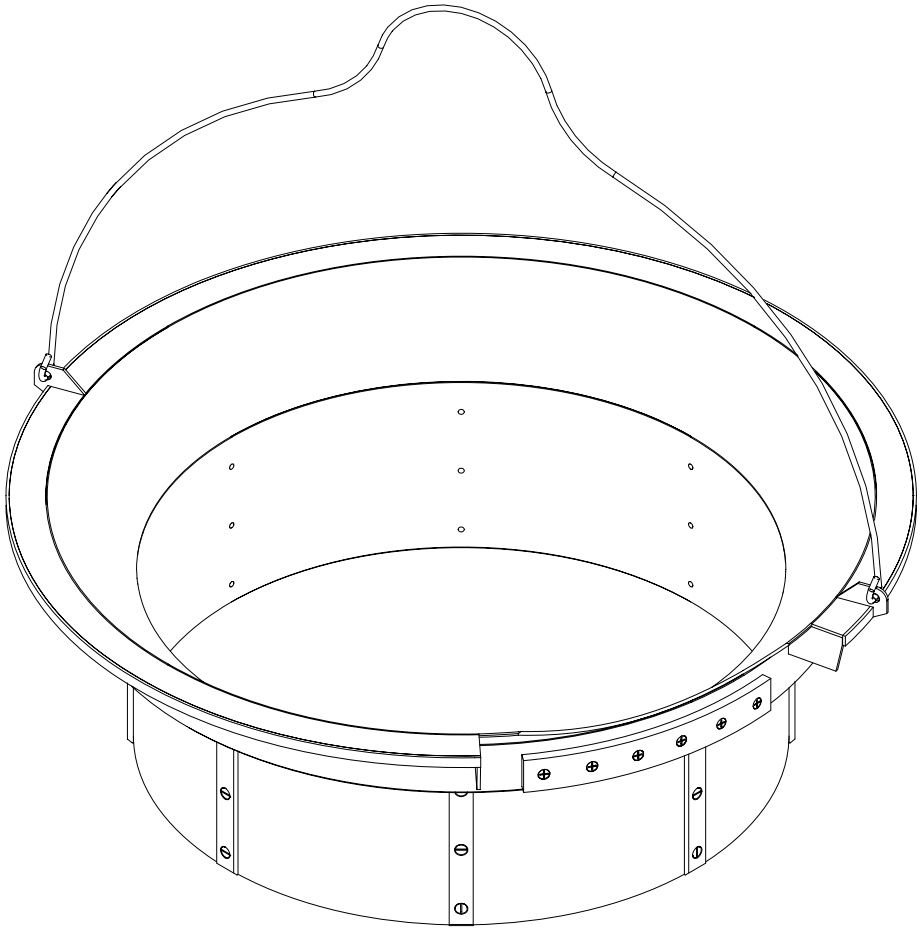


| Figure 1.14 - Lid Alignment Arm



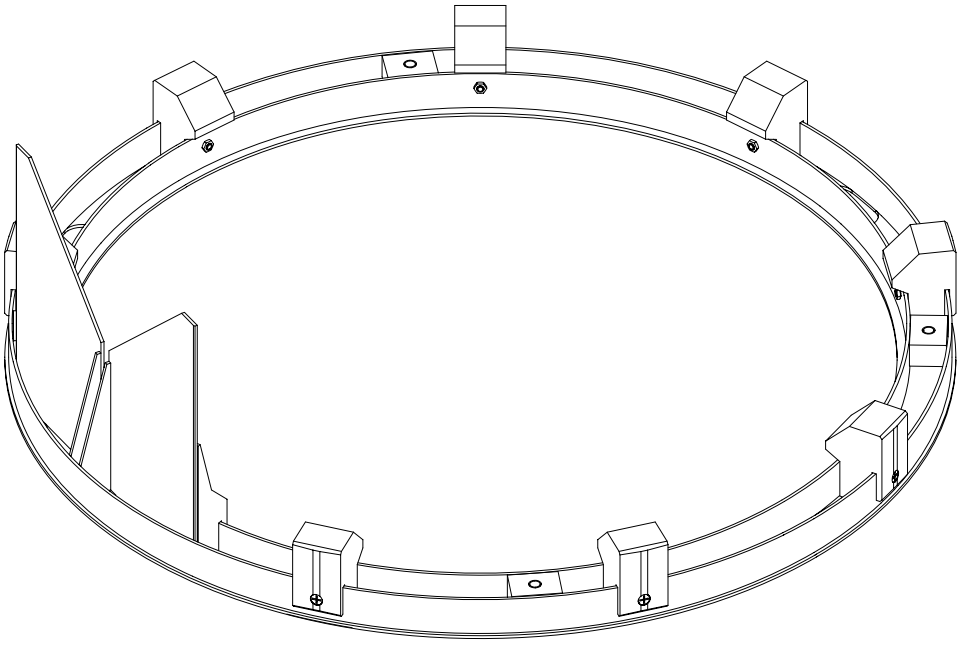
| LID ALIGNMENT ARM

Figure 1.15 - IV Seal Surface Protector



IV SEAL SURFACE PROTECTOR

| Figure 1.16 - OC Seal Surface Protector



| OC SEAL SURFACE PROTECTOR

1.7 Spare Parts (Bench Stock)

Table 1.3, Spare Parts (Bench Stock for users), lists the spare parts that support replacement of packaging components during routine operations by all users. Levels of supply are based on historical data relating to the frequency of usage of packaging and are expressed as the quantity of parts that should be on hand with minimum/maximum levels to be stocked. A bench stock inventory should be conducted quarterly to determine shortages. Replacements will be provided through the WIPP M&O Contractor RH Packaging Maintenance Engineer. The on-hand, purchase order (PO) number, and needed columns may be used to conduct inventories and should be faxed, or e-mailed, to the WIPP M&O Contractor RH Packaging Maintenance Engineer quarterly (at the end of March, June, September, and December) for parts replacement. There may be several different PO numbers associated with a given part. Sites are responsible for notifying the WIPP M&O Contractor when spare parts are needed.

Table 1.4, Spare Parts (Bench Stock for Maintenance) lists the spare parts that support replacement of packaging components during repair activities. The parts listed in Table 1.4 have special requirements for replacement and can be replaced after getting approval from the WIPP M&O Contractor RH Packaging Maintenance Engineer.

Table 1.3 - Spare Parts (Bench Stock for Users)

Description	Part No./ Substitute	PO No.	Min/ Max	On Hand	Needed
IV Gas Sampling Port Outer O-Ring Seal	2078-200-01		1 - 10		
IV Gas Sampling Port Inner O-Ring Seal	2078-200-02		1 - 10		
IV Backfill Port O-Ring Seal	2078-200-03		1 - 10		
IV Seal Test Port O-Ring Seal	2078-200-04		1 - 10		
IV Lower Main O-Ring Seal	2078-200-05		1 - 10		
IV Middle Main O-Ring Seal	2078-200-06		1 - 10		
IV Upper Main O-Ring Seal	2078-200-07		1 - 10		
IV Gas Sampling Port Closure Bolt	2078-200-10		1 - 3		
IV Backfill Port Closure Bolt	2078-200-11		1 - 3		
IV Seal Test Port Closure Bolt	2078-200-12		1 - 3		
IV Lid Closure Bolt	2078-200-13		1 - 3		
IV Lid Closure Bolt Spring	2078-200-14		1 - 8		
IV Lid Closure Bolt Thread Insert	2078-200-15		1 - 3		
IV Lid Closure Bolt Spring Washer (optional)	2078-200-20		0 - 15		
OC Gas Sampling Port O-Ring Seal	2078-300-01		1 - 10		
OC Seal Test Port O-Ring Seal	2078-300-02		1 - 10		
OC Lower Main O-Ring Seal	2078-300-03		1 - 10		
OC Upper Main O-Ring Seal	2078-300-04		1 - 10		
OC Gas Sampling Port Closure Bolt	2078-300-10		1 - 3		

Table 1.3 - Spare Parts (Bench Stock for Users)					
Description	**Part No./ Substitute**	**PO No.**	**Min/ Max**	**On Hand**	**Needed**
OC Seal Test Port Closure Bolt	2078-300-11		1 - 3		
OC Lid Closure Bolt	2078-300-12		1 - 3		
OC Lid Closure Bolt Thread Insert	2078-300-13		1 - 3		
Upper Impact Limiter Attachment Bolt	2078-400-10		1 - 3		
Lower Impact Limiter Attachment Bolt	2078-400-11		1 - 3		
Upper/Lower Impact Limiter Thread Insert	2078-400-13		1 - 3		
Plastic Pipe Plugs	2078-400-15		1 - 3		

Table 1.4 - Spare Parts (Bench Stock for Maintenance)					
Description	**Part No./ Substitute**	**PO No.**	**Min/ Max**	**On Hand**	**Needed**
IV Backfill Port Insert	2078-200-16		1 - 3		
IV Gas Sampling Port Insert	2078-200-17		1 - 3		
IV Seal Test Port Insert	2078-200-18		1 - 3		
IV Lid Alignment Pin	2078-200-19		1 - 3		
OC Seal Test Port Insert	2078-300-14		1 - 3		
OC Gas Sampling Port Insert	2078-300-15		1 - 3		
OC Lid Alignment Pin	2078-300-16		1 - 3		
Pad Eye	2078-400-14		1 - 3		
Impact Limiter Lift Lug Assembly	2078-400-16		1 - 3		

1.8 Transport Trailer

The RH transport trailer is designed for transportation of the empty RH packaging and loaded RH packages. Air-ride suspension trailers are designed with a goose neck equipped with a standard kingpin arrangement. Each trailer is equipped with trunnion cap devices used for securing packages to the trailer.

WIPP uses two types of RH 72-B trailers to transport RH packaging. The first is the RH-72-B cask fleet spread axle trailer. This trailer is described further in WP 08-PT.11, RH-TRU 72-B Cask Trailer Operation and Maintenance Manual. The second type of trailer is the RH-TRU 72-B cask uprighting trailer. This trailer is further described in WP 08-PT.13, RH-TRU 72-B Cask Uprighting Trailer Operation and Maintenance Manual.

2.0 GENERAL REQUIREMENTS

2.1 Records Maintenance

Packaging users and maintenance contractors must comply with 10 CFR §71.91, "Records." Records regarding inspections, tests, and maintenance must be retained for three years after the life of the package to which they apply. Records relating to each shipment must be maintained for three years after the shipment.

All records of maintenance activities performed on the packaging shall be forwarded to the WIPP M&O Contractor for retention. Records are designated as QA records and will be maintained as permanent records. All records concerning design, fabrication, and assembly, results of reviews, inspections, tests, and audits; results of monitoring work performance and materials analyses; and results of maintenance, modification and repair activities must be retained for three years after the life of the packaging to which they apply. Inspection, test, and audit records must identify the inspector or data recorder, the type of observation, the results, the acceptability and the action taken concerning any deficiencies noted.

2.2 Document Distribution

Upon completion, original maintenance records and copies of supporting documentation shall be transmitted to the WIPP M&O Contractor RH Packaging Maintenance Engineer, P.O. Box 2078, mailstop GSA-211, Carlsbad, NM 88221 within seven working days of performance of maintenance. The maintenance records will become part of the permanent RH packaging system record. A copy should be faxed or e-mailed immediately upon completion to the WIPP M&O Contractor RH Packaging Maintenance Engineer at (505) 234-7055.

Users preparing maintenance records should retain copies for their files.

The work instructions should be used as a checklist by those performing the work. Data attachments to the work instructions **must be** transmitted to WIPP with the original RH packaging maintenance record, unless stated otherwise in the work instruction.

2.3 Approved Work/Periodic Maintenance Instructions

Periodic and unscheduled maintenance tasks shall be accomplished using preapproved work instructions and/or one-time use repair instructions.

Approved work and periodic maintenance instructions are listed in Attachment B, Approved Work Instructions, of this manual. These are available on the internet at http://www.wipp.energy.gov/library/caolib.htm#containers. Completed originals will be filed with and become part of the permanent record. For approved work instructions intended for one-time use (either the WIPP M&O Contractor or vendor-generated), the original will become part of the permanent record. Users are responsible for ensuring that they have the latest approved revision.

2.4 Material Control

All initial and replacement components of the packaging are procured by the WIPP M&O Contractor and shall be verified as complying with applicable material requirements as specified in SARP drawings. Inspection reports, certified material test reports, and material certificates of conformance shall be maintained by the WIPP M&O Contractor.

Spare parts will be furnished to user sites by the WIPP M&O Contractor. The parts package will be labeled (or will have a detachable label inside the package) with the part number, description, and the WIPP PO number and shelf-life expiration date, if applicable. Users will segregate and store parts by part number. Site bench stock should be maintained at the levels shown in Table 1.3. Expiration dates should be checked prior to issue of O-rings, with priority of issue given to O-rings with the shortest remaining shelf life (as applicable). Shelf life should also be considered when conducting inventories and requesting additional stock.

All replaced (used) components should be disposed of following site procedures. If return of used components is deemed necessary for analysis, usage trends, or investigation, a formal request for return will be issued to user sites.

2.5 Quality Assurance Requirements

A fully compliant and approved QA system, meeting controlling functions of the applicable 18 criteria of 10 CFR Part 71, Subpart H, "Quality Assurance," shall be implemented at the loading and unloading facilities as defined by DOE Order 460.2, *Departmental Materials Transportation and Packaging Management*. Annex 2 of the NRC Regulatory Guide 7.10 shall be used as a guideline. These requirements also apply to maintenance, repair, replacement and/or modifications, as approved by the owner.

Existing QA programs may be used to satisfy the above requirements, provided a review has been made as to their applicability to the scope of activities performed by each participant and equivalency of the program to the NRC's QA program requirements in Subpart H. It is the responsibility of the involved participant to obtain approval of their QA program from the appropriate DOE Field Office.

Before loading a cask with radioactive waste, an audit or surveillance will be conducted by CBFO and the site shall be certified to use the cask upon successful completion of this audit. (This does not apply to small quantity sites being loaded by a qualified mobile loading crew.)

2.6 Training Requirements

Users (sites that ship or receive waste) shall have the responsibility for a training program, specific to this work scope, to ensure that qualified personnel experienced in their assigned tasks satisfactorily perform maintenance, nondestructive testing, leak testing, component replacement and related operations. To ensure uniformity of training, Attachment C, RH Packaging Qualification Requirements, is included and

provides the **minimum** requirements that must be included in site qualification cards for those sites which use the packaging. Users may supplement these requirements as appropriate. Maintenance contractors shall have a training program to train their employees to the requirements of this document, DOE/WIPP-02-3284, and DOE/WIPP-02-3285, *RH Packaging Maintenance Manual*.

Leak test personnel shall meet the requirements of the American Society of Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A - June 1980 Edition.

2.7 Maximum Packaging Weights

The WIPP Waste Information System (WWIS) Packaging Reference Data Table may be used to obtain packaging weights.

The maximum gross shipping weight of an RH-TRU 72-B shipping package with a payload is 45,000 lb.

2.8 Shipping Requirements

When shipping empty packaging to WIPP, sites will fax a copy of the radiation and contamination survey and survey map, (internal [if opened] and external) performed when the packaging was last closed, to the WIPP M&O Contractor Radiological Control at (505) 234-8963, or 234-6030 (Shipping Coordination), before departure.

2.9 Shipment Scheduling

Package shipments are coordinated by the WIPP M&O Contractor Shipping Coordination. Once agreed upon by the shipping site traffic manager and the representative, the generator site will enter the advance shipment schedule into the DOE Transportation Tracking and Communication System (TRANSCOM) satellite-based shipment tracking system. Based on this schedule, the shipper is responsible for entering the bill of lading into TRANSCOM at least 24 hours before shipment. Before departure of the shipment, the shipper is required to change the Designated User in the TRANSCOM bill of lading to that of the WIPP CMR.

In addition, only shipments approved in the WWIS shall be accepted for transport to WIPP.

2.10 Nonconformance Reports

Conditions encountered during operation or inspection of the packaging, excluding those that are correctable using the work instructions in Attachment B, (that can be corrected by packaging users), shall be brought to the attention of the WIPP M&O Contractor RH Packaging Maintenance Engineer for resolution, and shall be entered into the Computerized History and Maintenance Planning System (CHAMPS). An evaluation of the noted condition will be performed to determine whether a condition adverse to quality (CAQ) exists. If a CAQ exists, the packaging shall be controlled to prevent further use until either dispositioned to "use as is," or until the problem is

corrected. An NCR shall be issued by WTS when a CAQ exists. Any damage found on the packaging (except damage to O-rings) will be written and dispositioned by WTS using the NCR process.

3.0 PAYLOAD PREPARATION

It is the responsibility of the user to build payloads that meet the requirements in the C of C and in the TRAMPAC.

WP 08-PT.07, RH-TRU 72-B Cask Removable Lid Canister Handling and Operation Manual, describes how to load the removable lid canisters and is available at http://www.wipp.energy.gov/library/caolib.htm#containers.

DOE/WIPP 02-3284, for the payload loading into the 72-B cask is available on the internet at http://www.wipp.energy.gov/library/RH72B/02-3284.pdf. Users are responsible for ensuring they are using the current revision and change notice.

4.0 PACKAGE OPERATING INSTRUCTIONS

DOE/WIPP 02-3284 is available on the internet at http://www.wipp.energy.gov/library/RH72B/02-3284.pdf. Users are responsible for ensuring they are using the current revision and change notice.

5.0 PACKAGE MAINTENANCE INSTRUCTIONS

This section describes the maintenance program used to ensure continued performance of the packaging (see Section 1.3, Definitions for Annual and Five-Year Maintenance). Each cask must be current on its annual maintenance before shipping waste within the cask. Annual maintenance tests and inspections need not be performed for out-of-service packages.

All maintenance, repairs performed, or components replaced will be documented using a Maintenance Record. Information regarding preparation of the Maintenance Record is outlined in Section 5.4, Maintenance Records. Records shall be maintained by the WIPP M&O Contractor to document completion of the maintenance schedule. Records regarding inspections, tests, and maintenance must be retained for three years after the life of the package to which they apply.

If a deficiency is found which is not covered by this document, or which is beyond the repair capability of the discovering site, that site will follow its approved procedure for reporting deficiencies and contact the WIPP M&O Contractor RH Packaging Maintenance Engineer within 24 hours for disposition. Any damage found will be dispositioned by WTS using the NCR process following WIPP site procedures (not including O-ring damage). All questions regarding the continued integrity of packagings shall be addressed, in writing, to the WIPP M&O Contractor Transportation Program, MS-GSA-211, P.O. Box 2078, Carlsbad, NM 88221.

Preapproved work instructions are listed and linked in Attachment B. Maintenance activities not within the scope of preapproved work instructions shall be performed using procedures reviewed and approved by the WIPP M&O Contractor RH Packaging Maintenance Engineer before use. Recommendations for new work instructions or modifications to existing work instructions shall be forwarded in writing to the WIPP M&O Contractor RH Packaging Maintenance Engineer.

Scheduled and unscheduled maintenance will be coordinated by the WIPP M&O Contractor Transportation Project. Maintenance will be scheduled to maximize the availability of packaging.

NOTE: *Section 5.1, Annual Visual Inspections. These inspections are normally done at WIPP or by a WIPP M&O contractor's subcontracted vendor. Work instructions for annual and five-year maintenance inspections should be used as a checklist when performing these inspections.*

Structural, fabrication, and maintenance leakage rate test procedures are found in DOE/WIPP 02-3285, *RH Packaging Maintenance Manual*, at the following link: http://www.wipp.energy.gov/library/RH72B/02-3285.pdf.

5.1 Annual Visual Inspections

Table 5.1, Annual Visual Inspections, Acceptance Criteria and Corrective Action, defines the annual visual inspections to be performed on the IV and OC. General cleanliness should be observed for all components. Cloths or towels and denatured alcohol should be used to clean components to enable proper visual inspection of the components. Visual inspections shall determine that surfaces are free of excessive deformation and that all threaded components are as specified and in good operating condition.

5.1.1 Annual Component Inspections

Table 5.2, Annual Component Inspection, Acceptance Criteria and Corrective Action, denotes the annual dimensional inspections to be performed. General cleanliness should be observed for all components. Use cloths or towels and denatured alcohol to clean components to enable proper dimensional inspection. Should components fail to meet the defined acceptance criteria following corrective action(s), prepare an NCR for disposition. All NCRs shall be dispositioned by the WIPP M&O Contractor.

5.1.2 Annual IV Interior Surfaces Inspection

An annual inspection shall be performed on the interior welds and accessible internal base metal surfaces of the IV. The inspections shall be performed by visual inspection. The visual inspection shall be for surface corrosion. If an abnormality is found during visual inspection then a liquid penetrant inspection will be performed. If surface corrosion indications are found, locations will be recorded, a photographic record made, and an Approval Request/Variation Request (AR/VR) submitted for disposition by the WIPP M&O Contractor RH Packaging Maintenance Engineer.

Following the IV interior surfaces visual inspection, all welds and base metal shall be visually inspected for plastic deformation or cracking. If indications are found then a liquid penetrant inspection must be performed per ASME Boiler and Pressure Vessel Code, Section V, Article 6, and ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NB, Articles NB-2500 and NB-5000. Indications of cracking shall be recorded on an NCR and dispositioned before corrective actions. Relevant indications shall be repaired following applicable work instructions.

5.2 Five-Year Inspections

Five-year inspections shall consist of all of the annual inspection requirements, liquid penetrant inspections of all interior and exterior base material and pressure retaining welds, and threaded component replacement following Work Instruction RH.08.

5.2.1 Five Year Structural Test

At a maximum five-year interval, inspections shall be performed on the accessible exterior base material, OC interior, and IV interior and exterior surfaces for evidence of chemically induced stress corrosion. This shall consist of a liquid penetrant inspection of all surfaces. This includes accessible shell, head, flange and weld surfaces per ASME Boiler and Pressure Vessel Code, Section V, Article 6; and Section III, Division 1, Subsection NB, Article NB-5000.

Upon successful completion of the preceding tests, periodic leakage rate testing shall be performed.

5.2.2 Structural Pressure Test

There is no requirement for an annual or five-year structural pressure test. Structural pressure tests shall be completed on RH-TRU 72-B casks after completion of a weld repair to a containment structure. The OC and IV shall be pressure tested to 150 percent of the maximum normal operating pressure to verify structural integrity. The maximum normal operating pressure of the OC and IV is 150 psig; therefore, the OC and IV shall be pressure tested to 225 psig. Upon completion of the pressure test, the OC interior, IV interior and exterior base material and pressure retaining welds shall be visually inspected for plastic deformation or cracking and shall be examined by liquid penetrant examination method according to Section V Article 6; and Section III, Division 1, Subsection NB, Articles NB-2500 and NB-5000, of ASME Boiler Pressure Vessel Code. Indications of cracking or distortion shall be recorded on an NCR for disposition by the WIPP M&O Contractor RH Packaging Maintenance Engineer.

Upon successful completion of the preceding tests, periodic leakage rate testing shall be performed.

5.3 Packaging Component Replacement Schedule

Packaging components shall be replaced as defined in the schedule provided in Table 5.3, Component Replacement Schedule and Work Instruction, or when damage is

noted. Should replacement of a given component fail to meet the acceptance criteria, an NCR shall be prepared for disposition by the WIPP M&O Contractor.

5.4 Maintenance Records

All maintenance performed on RH packaging shall be thoroughly and completely documented on a Maintenance Record (Figure 5.1, Maintenance Record).

5.4.1 Instructions for Completing the Maintenance Record

- Packaging S/N - Record the serial number of the packaging *(Example: 00-02)*.
- Date Initiated - Enter the date that the maintenance was initiated. *(If no corrective actions are performed immediately, enter the date the discrepancy was discovered.)*
- Location/Site - Enter the acronym for the site or location initiating the maintenance. *(Example: INEEL, WIPP, or EPD, etc.)*
- Job No. - Enter the next sequential job number from the site packaging maintenance log. *(See Section 5.6, Maintenance Log.)*
- Reason for Maintenance - Check the appropriate block. Check *other* for unscheduled inspections, modification, or repairs that are not listed in Attachment B.
- Discrepancy Description - Provide a short narrative description of repair or other discrepancies. No entry is required specifically for annual or five-year maintenance, but list discrepancies discovered as part of these scheduled inspections. List NCR numbers, tag numbers, or correspondence letter numbers, if applicable.
- Work Performed - Provide a concise description of the actions taken to correct discrepancies listed in the Discrepancy Description block. *(Example: Replaced IV lid containment O-ring.)*
- Work Instructions Used - List the work instruction numbers (e.g., WI-RH.01, WI-RH.02, etc.) used to perform the maintenance covered by the maintenance record.
- Measuring and Test Equipment (M&TE) Used - List the M&TE description, serial number (S/N) (also known as the ID number), calibration due date and work instruction used.
- Spare Parts Used - List any spare parts used by description, part number, and WIPP PO number. *(Required information is printed on packages or available on a removable label provided in the package. Place label in space provided.)*

- Work Inspected By - Should be signed and dated by the **supervisor** of the personnel who performed the work. The signature verifies that the actions taken were within the scope of the work instruction or traveler (if applicable) and the packaging can be returned to service. This signature also shows that the maintenance record is **accurate and complete** (i.e., all applicable supporting documentation is attached).

- Attach any Certified Material Test Reports or other reports for materials used.

5.5 Maintenance Record Disposition

Upon completion, the **ORIGINAL** RH packaging maintenance record, including original attachments to the work instructions, shall be transmitted within seven working days of performance of maintenance to: WIPP M&O Contractor RH Packaging Maintenance Engineer, P.O. Box 2078, Carlsbad, NM 88221. Each record should be placed in numerical order for shipment to the WIPP M&O Contractor RH Packaging Maintenance Engineer. Records regarding inspections, tests, and maintenance must be retained for three years after the life of the package to which they apply.

5.6 Maintenance Log

Each user site shall maintain a packaging maintenance log. The log shall contain copies of completed maintenance records and a sequential listing, by job number, of maintenance performed on packaging. The user copies of maintenance records should be kept for three years, after which they may be sent to RH PME for reconciliation of maintenance records and parts usage before being destroyed.

5.7 Maintenance Due Labels

Upon completion of annual maintenance, the maintenance facility shall affix, next to the name plate, a maintenance due label. The RH packaging is considered **Out-of-Service** on the first day of the month shown on this label.

Upon completion of five-year maintenance, the maintenance facility shall affix, next to the name plate, a maintenance due label. The RH packaging is considered **Out-of-Service** on the first day of the month shown on this label.

Figure 5.1 - Maintenance Record

Package S/N		**MAINTENANCE RECORD**			
Location/Site		Date initiated		Job No	
Check all applicable:	Five-Year PM ☐	Annual PM ☐	Repair ☐	Other ☐	
Discrepancy Description:					
Work Performed:					
Work Instructions Used:					

Measuring and Test Equipment Used

Description	S/N	Calibration Due Date	Work Instruction

Spare Parts Used

(If self-stick labels are used, they shall contain a part description, part number and PO number. Enter each part quantity)

Description/part number/WIPP PO number:	Qty	Description/part number/WIPP PO number:	Qty

If Continuation Sheet used check, yes:	Yes	

Work inspected by _____ _____ _____

Print name Signature Date

Figure 5.1 - Maintenance Record (continued)

MAINTENANCE RECORD - (Continuation Sheet)*

Job No		Package S/N	

Work Inspected by _____ _____ _____

Print Signature Date

* If Continuation Sheet not used, discard.

Table 5.1 - Annual Visual Inspections, Acceptance Criteria and Corrective Action

Component/Part No.		Acceptance Criteria	Corrective Action	✓
IV Gas Sampling Port Closure Bolt	(2078-200-10)	No damaged threads or damaged head	Replace per WI-RH.01	
IV Gas Sampling Port Insert	(2078-200-17)	No damaged threads or damaged sealing surface	Replace per WI-RH.05	
IV Backfill Port Closure Bolt	(2078-200-11)	No damaged threads or damaged head	Replace per WI-RH.01	
IV Backfill Port Insert	(2078-200-16)	No damaged threads or damaged sealing surface	Replace per WI-RH.05	
IV Seal Test Port Closure Bolt	(2078-200-12)	No damaged threads or damaged head	Replace per WI-RH.01	
IV Seal Test Port Insert	(2078-200-18)	No damaged threads or damaged sealing surface	Replace per WI-RH.05	
IV Lid Closure Bolt	(2078-200-13)	No damaged threads or damaged head	Replace per WI-RH.03	
IV Lid Closure Bolt Thread Insert	(2078-200-15)	No damaged threads or damaged sealing area	Replace per WI-RH.05	
IV Lid Alignment Pins	(2078-200-19)	No damage to pin	Replace per WI-RH.04	
IV Upper, Lower and Middle Flange Sealing Surfaces		No scratches causing leakage or finish >125 RMS micro-finish	Repair per WI-RH.06	
IV Shell Wall Surfaces		No gouges or scratches causing wall thickness to be < 0.365-in., or weld cracks or punctures	Repair per WI-RH.07	
IV Visible Body Inner Surfaces		No signs of corrosion	NCR for disposition	
OC Gas Sampling Port Closure Bolt	(2078-300-10)	No damaged threads or damaged head	Replace per WI-RH.01	
OC Gas Sampling Port Insert	(2078-300-15)	No damaged threads or damaged sealing surface	Replace per WI-RH.05	
OC Seal Test Port Closure Bolt	(2078-300-11)	No damaged threads or damaged head	Replace per WI-RH.01	
OC Seal Test Port Insert	(2078-300-14)	No damaged threads or damaged sealing surface	Replace per WI-RH.05	
OC Lid Closure Bolts	(2078-300-12)	No damaged threads or damaged head	Replace per WI-RH.03	
OC Lid Closure Bolt Thread Insert	(2078-300-13)	No damaged threads or damaged sealing surface	Replace per WI-RH.05	

Table 5.1 - Annual Visual Inspections, Acceptance Criteria and Corrective Action

Component/Part No.		Acceptance Criteria	Corrective Action	✓
OC Lid Alignment Pins	(2078-300-16)	No damage to pins	Replace per WI-RH.04	
Upper Impact Limiter Attachment Bolts	(2078-400-10)	No damaged threads or damaged head	Replace/Repair per WI-RH.03	
Lower Impact Limiter Attachment Bolt	(2078-400-11)	No damaged threads or damaged head	Replace/Repair per WI-RH.03	
Upper/lower Impact Limiter Thread Insert	(2078-400-13)	No damaged threads or damaged sealing surface	Replace per WI-RH.05	
OC Upper and Lower Flange Sealing Surfaces (Grooves and Flats)		No scratches causing leakage or finish >125 RMS micro-finish	Repair per WI-RH.07	
OC Visible Shell Inner Wall Surfaces		No gouges causing wall thickness to be < 0.990 in., or weld cracks, or punctures	Repair per WI-RH.07	
Plastic Pipe Plugs	(2078-400-15)	Properly tightened (± 1/8 in. from surface) and not missing	Replace per WI-RH.04	
Pad Eyes	(2078-400-14)	Pad eyes are not bent or missing	Replace per WI-RH.04	
Impact Limiters				
Impact Limiter Lift Lug Assembly	(2078-400-16)	Hinge not damaged or missing parts	Replace per WI-RH.04	
Foam		Deviations from design requirements which prevent intended function, including cracks or voids and egress of moisture	Repair depends on condition noted. Contact the WIPP M&O Contractor.	
Impact Limiters		Dents, cuts and/or punctures, indications of loss of weld integrity and general cleanliness	Repair depends on condition noted. Contact the WIPP M&O Contractor.	
OC Thermal Shield Inspection		No dents, cuts and/or punctures, indications of loss of weld integrity and general cleanliness	Repair depends on condition noted. Contact the WIPP M&O Contractor.	

Table 5.1 - Annual Visual Inspections, Acceptance Criteria and Corrective Action

Component/Part No.	Acceptance Criteria	Corrective Action	✓
Trunnions	Excessive wear, galling, or distortion	Repair depends on condition noted. Contact the WIPP M&O Contractor.	
IV/OC Painted Markings	Markings are clear and not worn	Repair depends on condition noted. Contact the WIPP M&O Contractor.	

Table 5.2 - Annual Component Inspection, Acceptance Criteria and Corrective Action

Component	Acceptance Criteria	Corrective Action	✓
OC/IV O-Ring Seal Surfaces	125 micro-inch finish or better	Repair per WI-RH.06	
IV Bottom Forging Exposed Surfaces	1.438 in. or greater on UT measurement	Repair per WI-RH.07	
OC Bottom Forging Exposed Surfaces	4.875 in. or greater on UT measurement	Repair per WI-RH.07	
IV Inner/Outer Shell Wall Exposed Surfaces	0.365 in. or greater on UT measurement	Repair per WI-RH.07	
OC Inner Shell Wall Exposed Surfaces	0.990 in. or greater on UT measurement	Repair per WI-RH.07	
IV Lid Exposed Surfaces	6.25 in. or greater on UT measurement	Repair per WI-RH.07	
OC Lid Exposed Surfaces	5.875 in. or greater on UT measurement	Repair per WI-RH.07	
OC Thermal Heat Shield	0.123 in. or greater on UT measurement	Repair per WI-RH.07	
IV/OC Port Closure Bolt O-Ring Seal Grooves	No nicks, scratches or burrs	Replace per WI-RH.01	

NOTE: After completion of maintenance, the maintenance provider will affix a label next to the packaging nameplate showing the date the next annual or five-year maintenance is due.

Table 5.3 - Component Replacement Schedule and Work Instruction

Component and Part Number		Frequency*	Work Instruction	✓
Inner Vessel Lower Main O-Ring Seal	(2078-200-05)	A	WI-RH.02	
Inner Vessel Middle Main O-Ring Seal	(2078-200-06)	A	WI-RH.02	
Inner Vessel Upper Main O-Ring Seal	(2078-200-07)	A	WI-RH.02	
Outer Cask Lower Main O-Ring Seal	(2078-300-03)	A	WI-RH.02	
Outer Cask Upper Main O-Ring Seal	(2078-300-04)	A	WI-RH.02	
IV Gas Sampling Port Outer O-Ring Seal	(2078-200-01)	A	WI-RH.01	
IV Gas Sampling Port Inner O-Ring Seal	(2078-200-02)	A	WI-RH.01	
IV Backfill Port O-Ring Seal	(2078-200-03)	A	WI-RH.01	
IV Seal Test Port O-Ring Seal	(2078-200-04)	A	WI-RH.01	
OC Gas Sampling Port O-Ring Seal	(2078-300-01)	A	WI-RH.01	
OC Seal Test Port O-Ring Seal	(2078-300-02)	A	WI-RH.01	
IV Lid Closure Bolts	(2078-200-13)	5	WI-RH.03	
OC Lid Closure Bolts	(2078-300-12)	5	WI-RH.03	
Upper Impact Limiter Attachment Bolt	(2078-400-10)	5	WI-RH.03	
Lower Impact Limiter Attachment Bolt	(2078-400-11)	5	WI-RH.03	
* A = Annual, 5 = five years				

6.0 PACKAGE MAINTENANCE LEAKAGE RATE TESTING

DOE/WIPP 02-3285, *RH Packaging Maintenance Manual*, for maintenance leakage rate testing is available on the internet at http://www.wipp.energy.gov/library/RH72B/02-3285.pdf.

7.0 PACKAGE STRUCTURAL PRESSURE TESTING

DOE/WIPP 02-3285, *RH Packaging Maintenance Manual*, for structural pressure testing is available on the internet at http://www.wipp.energy.gov/library/RH72B/02/3285.pdf.

Attachment A - Work Instruction Format

A.1 Preparing Work Instructions for Periodic Maintenance or Initial Release

All packaging work/periodic maintenance instructions will be written using the following work instruction format. The following descriptions and examples will aid in writing work instructions:

- Title

  A short description of the work or periodic maintenance to be performed, along with the serial number of the packaging

- Instruction Number

  Assigned by the WIPP M&O Contractor. After the instruction number, enter the revision number.

- Page ___ of ___

  Form page number

- Approval Signature

- Applicable Drawings

  Drawings applicable to the work instruction. These may be SARP drawings or additional shop drawings required to complete the task.

- SARP Requirements

  A short narrative of the SARP requirement, referencing the appropriate SARP chapter and/or section(s)

- Special Tools Required

  Special tools required to complete the task

- Spare Parts Required

  All packaging spare parts required to complete the task

- Materials Required

  All materials required to complete the task

Attachment A - Work Instruction Format

- Safety Requirements

  Safety precautions needed to complete the task

- Prerequisite Conditions

  All required prerequisite conditions

- Instruction steps

  Detailed procedural steps needed to follow to complete the task

- Verification Requirements

  All verification requirements (e.g., leak-tests, material certification, etc.) required to complete the test

- Written By:

  Signature of person completing the work instruction

- Approved By: QA

  Signature of QA Manager

- Approved By: Transportation Programs

  Signature of Transportation Program Manager

  Appropriate signatures shall be provided for all signature blocks

A.2 Revising Existing Work Instructions

The revision will require the same approval as the original instruction. Revisions may be initiated in writing from a user to the WIPP M&O Contractor RH Packaging Maintenance Engineer.

The WIPP M&O Contractor RH Packaging Maintenance Engineer can be reached during normal hours at (505) 234-7015. After business hours, call the CMR at (505) 234-8125/8457 for communication of relevant items.

A.3 Cancellation of Existing Work Instructions

Approvals for cancellation will be made by the WIPP M&O Contractor RH Packaging Maintenance Engineer. A copy shall be provided to the CBFO. The cancellation letter shall be attached to the original work instruction and dispositioned per

Attachment A - Work Instruction Format

DOE-CAO-94-1001, CAO Information Management Plan. The canceled work instruction and all references to the canceled work instruction shall be deleted from this document through the normal change and revision procedure, and changes will be distributed to all user sites.

Attachment A - Work Instruction Format

Page ___of ___

WORK INSTRUCTION	
Title:	**Instruction No.: Rev.** **Page of**
Applicable Drawings:	
SARP Requirements:	
Special Tools Required:	
Spare Parts Required:	
Materials Required:	
Safety Requirements:	
Prerequisite Conditions:	

Attachment A - Work Instruction Format

Page ___of ___

WORK INSTRUCTION

Instruction No. Continued **Page of**

Instruction Steps:

Attachment A - Work Instruction Format

Page ___of ___

WORK INSTRUCTION

Instruction No. Continued **Page of**

Instruction Steps Continued:

Attachment A - Work Instruction Format

Page ___of ___

WORK INSTRUCTION
Instruction No. Continued **Page of**
Instruction Steps Continued:
Verification Requirements:
Written by: **Date:**
Approved by: QA Date:
Approved by: Transportation Programs Date:

Attachment B - Approved Work Instructions

NOTE: *All work instructions listed below can be performed by the maintenance vendor. Work instructions WI-RH.01 through WI-RH.05, and WI-RH.07 are considered to be within the capabilities of a user to perform (except any weld work that needs to be done which can be accomplished by the maintenance vendor). Users may replace any spare parts they are qualified to replace following approved work instructions.*

NOTE: *Conditions may warrant that only specific steps of a work instruction are required for corrective action. Consequently, it is acceptable to perform only the necessary steps of the work instruction and to mark with "N/A" the steps not needed.*

NOTE: *Packaging users are responsible for ensuring that the current revision of the work instruction is used.* Users can find the current revision to all work instructions at the following link: http://www.wipp.energy.gov/library/RH72B/rhwinst.htm.

- WI-RH.01, Replacement of IV/OC Port Closure Bolts and O-Rings
- WI-RH.02, Replacement of IV/OC Lid Main O-Rings
- WI-RH.03, Replacement of Lid Closure and Impact Limiter Attachment Bolts
- WI-RH.04, Replacement of Miscellaneous Parts Not Requiring Detailed Instructions
- WI-RH.05, Cleaning IV/OC Threads, Impact Limiter Threads, Threaded Inserts and Port Inserts
- WI-RH.06, IV/OC Sealing Surface Finish Inspection
- WI-RH.07, Minor Repair of IV and OC Lid and Body Exposed Surfaces
- WI-RH.08, Annual and Five-Year Maintenance Inspections
- WI-RH.09, Training Unit Fitness for Use Inspection
- WI-RH.10, Painting Markings on 72B Cask

Attachment C - RH Packaging Qualification Requirements

The following guidelines establish the minimum training requirements for RH packaging operations. User site qualification cards **SHALL** include these items as a minimum. Users may separate the requirements to address different skills used to load a RH packaging per site requirements if all areas are addressed by each site.

I. References

A. OPERATIONS

1. NRC-Docket-71-9212, *Safety Analysis Report for RH-TRU 72-B Waste Shipping Package*

2. DOE-STD-1090-2004, *Hoisting and Rigging Standard*

3. DOE/WIPP 02-3283, *RH Packaging Program Guidance*

4. DOE/WIPP 02-3284, *RH Packaging Operations Manual*

5. DOE/WIPP 02-3285, *RH Packaging Maintenance Manual*

B. MAINTENANCE

1. DOE/WIPP 02-3283, *RH Packaging Program Guidance*

2. DOE/WIPP 02-3284, *RH Packaging Operations Manual*

3. NRC-Docket-71-9212, *Safety Analysis Report for RH-TRU 72-B Waste Shipping Package*

4. DOE/WIPP 02-3285, *RH Packaging Maintenance Manual*

C. TRAILER LOADING AND UNLOADING

1. DOE/WIPP 02-3283, *RH Packaging Program Guidance*

2. DOE/WIPP 02-3284, *RH Packaging Operations Manual*

3. NRC-Docket-71-9212, *Safety Analysis Report for RH-TRU 72-B Waste Shipping Package*

4. DOE-STD-1090-2004, *Hoisting and Rigging Standard*

5. WP 08-PT.11, RH-TRU 72-B Cask Trailer Operation and Maintenance Manual

6. WP 08-PT.13, RH-TRU 72-B Cask Uprighting Trailer Operation and Maintenance Manual

Attachment C - RH Packaging Qualification Requirements

II. Knowledge

A. PACKAGING OPERATIONS

1. Discuss the IV/OC lid removal process (ref. A.1, A.4).

2. Describe the purpose and identify the type of seals used on the packaging (ref. A.1, A.3).

3. Describe the physical construction of the packaging assembly (ref. A.1, A.3).

4. State the lubrication requirements for the O-ring seals (ref. A.1, A.3).

5. Describe the cleaning requirements on the O-rings and why they should be cleaned. (Ref. A.3, A.4)

6. Identify the tools required for packaging operation and discuss the function of each tool (ref. A.3, A.4).

7. Identify and explain the purpose of the following packaging components (ref. A.1, A.3, A.4).

   a. Lid O-rings
   b. Closure bolts
   c. Impact limiters
   d. Port closure bolts
   e. Seal, gas sampling, and backfill ports

8. Discuss the limits associated with packaging operation (i.e., pressure, radiation levels) (ref. A.1, A.3, A.4).

   a. Maximum total weight of cask
   b. Maximum allowable weight of payload
   c. Maximum RAD levels in cask
   d. Maximum RAD levels on the surface
   e. Maximum design pressure in cask
   f. Maximum thermal watts per canister

9. State the location of the security seal (ref. A.1, A.3).

10. Describe the precautions that should be taken when removing the OC/IV lids (ref. A.1, A.2, A.3, A.4).

11. Describe the precautions that should be taken when installing the lids (ref. A.1, A.2, A.3, A.4).

12. State the inspection process for the IV, OC, and impact limiters (ref. A.1, A.3, A.4).

13. State the torque requirements for: (ref. A.1, A.2, A.3, A.4)

    a. Lid closure bolts
    b. OC port closure bolts
    c. IV port closure bolts

B. PACKAGING MAINTENANCE

1. Describe the method of cleaning the port threads (ref. B.1, B.2).

2. Discuss the different types of leak testing required for the packaging and when each must be performed (ref. B.1, B.2, B.3, B.4).

3. Identify the materials needed to clean the sealing surfaces (ref. B.1, B.2).

4. Describe how to complete a packaging maintenance record (ref. B.1).

5. State the record retention requirement for packaging maintenance records (ref. B.1).

C. TRAILER LOADING AND UNLOADING[1]

1. Describe the impact limiter removal process (ref. C.1, C.2, C.3, C.4, C.5, C.6).

2. Describe the process of removing the packaging from the trailer (ref. C.1, C.2, C.3, C.4, C.5, C.6) (not required for sites that do not remove the 72-B cask from the trailer).

3. Discuss what is inspected on the trunnion tiedown assembly (ref. C.2,C.5, C.6).

4. State the torque requirement for the trunnion tiedown cap bolts, and impact limiter attachment bolts (ref. C.2, C.3, C.5, C.6).

5. Describe how to lubricate trunnion tiedowns (ref. C.2, C.5, C.6).

6. State the maximum load limit for the trailer (ref. C.1, C.2, C.5, C.6).

7. Describe the process of installing trunnion tiedowns (ref. C.2, C.5, C.6).

[1]This section applies only to those sites that remove the packaging from the trailer.

Attachment C - RH Packaging Qualification Requirements

III. Operations

A. PACKAGING OPERATION

1. Perform OC lid removal (ref. A.1, A.4).
2. Perform IV lid removal (ref. A.1, A.4).
3. Load a cannister into IV (ref. A.1, A.2, A.3, A.4) (Generators only)
4. Inspect OC lid seal surfaces (ref. A.1, A.3, A.4).
5. Inspect OC body seal surfaces (ref. A.1, A.3, A.4).
6. Inspect IV lid seal surfaces (ref. A.1, A.3, A.4).
7. Inspect IV body seal surfaces. (ref. A.1, A.3, A.4).
8. Inspect IV/OC components (ref. A.1, A.3, A.4).
9. Perform IV lid installation (ref. A.1, A.2, A.3, A.4).
10. Perform OC lid installation (ref. A.1, A.2, A.3, A.4).

B. PACKAGING MAINTENANCE

1. Replace a lid O-ring (ref. B.1).
2. Replace a port closure bolt and O-ring (ref. B.1).
3. Complete a Maintenance Record (ref. B.1).

C. TRAILER LOADING AND UNLOADING

| 1. Remove impact limiters (ref. C.1, C.2, C.3, C.4, C.5, C.6).
| 2. Remove trunnion tiedown caps (ref. C.1, C.2, C.5, C.6).
| 3. Unload a packaging from a trailer (ref. C.1, C.2, C.3, C.4, C.5, C.6) (not required for sites that do not remove the 72-B cask from the trailer).
| 4. Load a packaging on the trailer (ref. C.1, C.2, C.3, C.4, C.5, C.6) (not required for sites that do not remove the 72-B cask from the trailer).
| 5. Perform trunnion tiedown assembly inspections (ref. C.1, C.2, C.5, C.6).

6. Install trunnion tiedown caps (ref. C.1, C.2, C.5, C.6).

7. Install impact limiters (ref. C.1, C.2, C.3, C.5, C.6).